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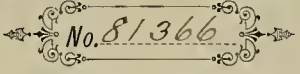
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
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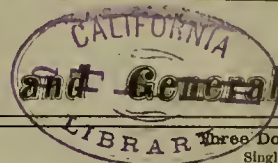
MINING AND SCIENTIFIC PRESS

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An Illustrated Journal of Mining, Popular Science and General News.

VOL. LX.—Number 1.
DEWEY & CO., PUBLISHERS.

SAN FRANCISCO, SATURDAY, JANUARY 4, 1890.



The Regan Vapor Engine.

An ever-increasing demand by the mechanical world for concentration and economy in motive-power has directed the attention of many inventors to the importance of the subject, with varying results. The most successful to which the attention of the PRESS has been called is that of the Regan vapor engine, invented and patented by Mr. Daniel S. Regan, a well-known mechanical engineer of this city.

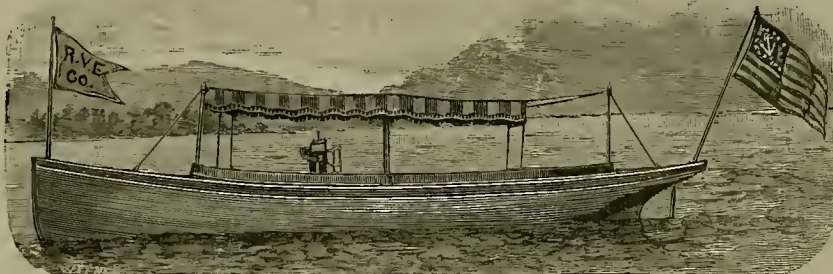
As shown in the engraving, this is a simple compact upright engine, and is operated by means of vapor drawn into the cylinder by the action of the piston and there exploded by an electric spark. A galvanized iron tank (the carburetor) contains a small quantity of gasoline; this is connected with the engine through any reasonable distance by means of a pipe. At each revolution of the fly-wheel a current of air is drawn through the carburetor and into the cylinder. In passing through the carburetor it vaporizes a quantity of gasoline, which united with more air drawn through the pipe and an air valve, forms the explosive charge, the explosion of which upon combustion develops the power.

The electric spark which produces the com-

fect safety by any intelligent man or boy. The engine is clean and comparatively noiseless and no license is required. Full power is developed at once, and when it ceases to run all expense stops. The cost of running is about one cent per horse-power per hour, where gasoline is used.

Where ordinary illuminating gas is available,

hand saws, coffee-mills and roasters, polishing machines, fanning machines in restaurants, sewing machines, ventilating apparatus, emery wheels, mining and milling machinery. Particular attention, also, is being given to lannohes and small boats of all kinds, either for business or pleasure, engines specially adapted to these



LAUNCH OPERATED BY REGAN VAPOR ENGINE.



THE REGAN VAPOR ENGINE.

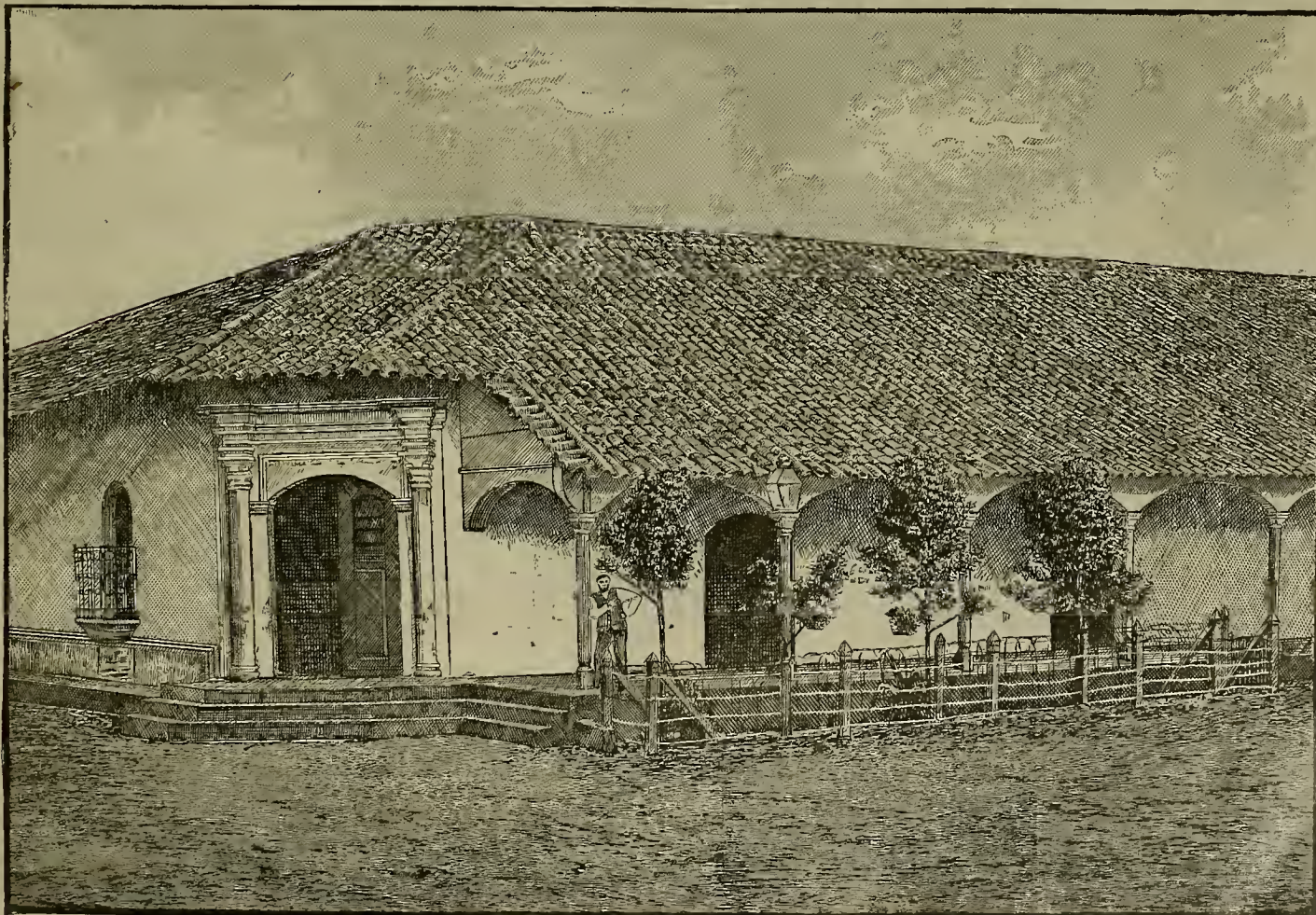
the connecting pipe can be attached to the meter, producing equally as good results.

Its compactness, lightness and cheapness especially commend it for such purposes as electric lighting, pumping, running elevators, har-

ness being built to order on short notice, and of any required horse-power. Its advantages in this connection are many.

A corporation with ample capital has been organized for the purpose of manufacturing the

ness circles: Francis Cutting, president; W. E. Miller, vice-president; Sanford Bennett, treasurer; Henry P. Dimond, secretary and manager; Daniel S. Regan, superintendent. The company occupies a commodious building



EXTERIOR OF A TYPICAL NICARAGUA HOUSE—See page 3.

hustion is controlled by a very simple mechanical device, automatic and never-failing in its action. The simple in construction is the Regan vapor engine that it can be operated with per-

vesting and threshing machines, printing presses, boot and shoe machinery and hoisting machines. In fact, it can be used anywhere that power is needed, as for circular, jig and

vapor engine, hulls for lannohes, irrigating pumps, etc., known as the Regan Vapor Engine Co. It is composed of the following named gentlemen, well and favorably known in busi-

ness circles: Francis Cutting, president; W. E. Miller, vice-president; Sanford Bennett, treasurer; Henry P. Dimond, secretary and manager; Daniel S. Regan, superintendent. The company occupies a commodious building

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

Mines of a Rainless Land—No. 2.

Iquique and the Silver Mines and Salt-peter Deposits.

[Written for the Press by "DON JUAN."]

In my last letter (page 448 of Dec. 14th) I gave you a description of the port of Iquique. In this one I will take you through some of the famous silver mines of "Huatajia," situated on the high mesa, some 3000 feet above the city of Iquique and about nine miles in an easterly direction from that place. It was on a warm October morning that I started as a guest of the American Vice-Consul, Mr. Rosenstock, with him and his engineer, Mr. Philipp, for my first visit and inspection of those mines. We started (on horseback, of course) about 4 o'clock in the morning, so as to escape the greatest heat of the scorching sun, which in this shadeless and windless country comes down mercilessly upon the traveler. The low beach upon which Iquique stands is about two miles wide, at the termination of which the greatest hardship of your short journey commences. Now you are obliged to ascend the "crest" of the mesa, and in the short distance of less than two miles you are carried something like 2000 feet nearer heaven, over a very rough and narrow trail, when you finally stand upon the seemingly level and endless mesa. From this point of observation a grand and magnificent panorama spreads itself around you. Looking east, your eyes sweep over the great mesa and foothills of the "Cordilleras de los Andes;" but the eyes do not rest here, for you also behold the Andes themselves in all their grandeur, and especially at this time of the morning is the scene a grand one, for just now the sun creeps over the mountain, its golden rays thrown against this always blue sky. The blue waters of the Pacific, just at our feet, make a thoroughly grand picture not soon to be forgotten.

From our temporary observatory, with the aid of our glass, we see the great mountain and volcano Sabana, rising to an altitude of 22,000 feet above sea level, and even Sorato, 21,286 feet, and Illimani, 21,224 feet, are visible. Giving still greater scope to our imagination, we turn our eyes further to the north and see old Misti from an elevation of 20,000 feet looking down upon us. And now we throw one look back upon the city at our feet and behold Iquique still lying in darkness below, for the sun is not high and near enough to let its rays be felt here, but far, far out to sea, many miles, we see the waters of old ocean already sparkling in sunshine. Surely a strange panorama—darkness here and sunshine there. But I think we have dreamed and admired long enough. Our horses, too, seem to have enjoyed the scenery and rest and are ready to start again.

We now make a straight line for our objective point, La Mina, St. Augustine, about one mile this side of the village of Huatajia. This large property was formerly owned by the American vice-consul, Mr. Rosenstock, who, two years ago, organized the St. Augustine Mining Co. with 12,000 shares at \$1 each, which were selling at the time of my visit, Oct. 7, 1887, at \$3.60 each. The shaft of this mine is down about 300 feet. The first 150 feet the country rock passed through is a very hard porphyry, which is the cap rock of the whole surrounding country. Usually the lodes are very poor in this formation, the thickness of which varies from 10 to 300 feet. Below this is found the limestone in which we find in this locality our richest metal.

From this 300-foot (the main shaft of the St. Augustine) extend levels in both directions from 50 to 600 feet in length, and considerable stopping has been done. The lode is about eight feet wide, runs nearly east and west, and has an inclination of about 41 degrees. The value of the ore runs from \$20 per ton to pure silver (plata blanca) of which sometimes large blocks have to be cut up with chisels. The ore is hoisted by (Malacator) horse whim and sent by cart to the Iquique mills, where it is reduced. The output on the ore for this short distance of eight or nine miles is 40 cents per cental. The St. Augustine employs from 80 to 120 peons (miners), who are watched over by a corps of some 25 Europeans, chiefly English and German.

Other prominent mines in this camp are the San Pedro and San Pablo, the Decubridora, the Margarita and many others; what has been said of the St. Augustine holds good for all of them with the exception of the San Pedro and San Pablo, which is the richest in camp. It is owned by Mr. Chase, also an American, who came to this coast some seven years ago—a poor sailor and is now worth about \$20,000,000, all of which he has made out of the above mine, of which he is the sole owner. I saw, myself, at this mine a block of native silver weighing a little over eight centals. Just think of it, a piece of solid silver just as it was taken out of the mine, over 800 pounds! But these rich nuggets of silver are common occurrences in all the great mines of the district.

About one mile below these mines is located the town of Huatajia. It is very old; the church is said to be 200 years old and I do not doubt it, for you can put your finger anywhere

through the rotten boards. The tower leans off to the south at an angle of about 30 degrees. It is as famous a piece of architecture in this part as the great leaning tower of Pisa. The mystery is that it has withstood so many storms and the earthquakes which are so common in these regions. Huatajia has about 1000 inhabitants, nearly all of whom follow mining for an occupation. From Huatajia it is about seven miles south to Santa Rosa, which, next to Huatajia, is the most productive mining-camp of Tarapaca. Of this I will tell you in my next.

Mines on Railroad Lands.

EDITORS PRESS:—Never since the beginning of time was there a greater fraud perpetrated, or attempted, than the getting of these mineral lands by the C. P. R. Co. These lands which we have mined for 40 years, and from which have been taken out untold millions of gold, are now claimed by this R. R. Co. as "agricultural." The fact is, there is little or no agricultural lands this high in the mountains, and for some miles below this. I will admit that there are some lands here that might be made agricultural by the application of manure and water in sufficient quantities—and the same might be said of the Great Sahara Desert. I know of small tracts of land in this vicinity that were cultivated in early times, that have now been abandoned for more than thirty years, and have grown up with young pines as large as a man's body; and this, too, where the parties so cultivating had an abundance of free water for irrigating purposes. Only think of it—in this township, 13 north, Range 11 east, M. D. B., less than a quarter-section is in cultivation all told, and more than half of this is for horticultural instead of agricultural purposes—less than 160 acres out of 23,040—rather a bad showing this, for the agriculturist; and yet these lands have been as free and open to the agriculturist as to the miner, for forty years.

It is a well-known fact to most miners that in this mineral belt of California, which is 30 or 40 miles in width, there is a small belt, say six or eight miles in width, which is much richer than on either side of it, and it is right here in this rich belt that the R. R. Co. has lately made application for 30,000 acres of agricultural land. These lands, when surveyed, were returned as mineral, and, as I said before, we have been mining them for 40 years; and now, if they are not mineral, I will unhesitatingly say there is none such in California.

It is high time Congress took hold of this matter and legislated upon the subject, and not only prevent this R. R. Co. from getting any more of these lands, but compel them to give up those already fraudulently obtained.

If our statesmen at Washington have any doubts as to the mineral character of this part of California, let them appoint and send out a commission to investigate the question. Have them ascertain if it is the even-numbered sections that are mineral, and from which the gold (if any) has been taken; and if the odd-numbered ones are agricultural, as the R. R. Co. claim they are.

If this should prove to be the case it will certainly be a phenomenon worthy the attention of all scientists.

We miners are now more hopeful that justice will be done us than we have been for a good many years past.

We think now that we have a Secretary of the Interior who is Noble in more than one sense. May he last. J. W. EDMONDSON.
Volcanoville, El Dorado Co., Cal.

Oregon Quartz and Placer Mines.

EDITORS PRESS:—Your correspondent met Mr. Gordon, well known in Healdsburg, Cal., who reports some valuable discoveries on the head-waters of the Sixes and its tributaries in the northern part of Curry county, Oregon. Mr. Gordon shows rich specimens of gold-bearing quartz from Sucker and Johnson's creeks in Coos county, where he and his partner, Mr. Hayes, have staked out claims that they intend to work as soon as the weather permits. Mr. Gordon also showed me a specimen of native copper, samples of which have been assayed two or three times, proving to be 95 per cent copper.

The Devilbiss brothers, the discoverers of quartz mines on Johnson's creek, are working their mine and are very much encouraged at their prospects, getting free gold and rich quartz. There are a number of good placer mines being worked lower down on Johnson's creek, and on Sucker creek also. Mr. More is working a hydraulic mine on Salmon creek, also a tributary of the South fork of the Coquille river in Coos county.

Others, who have prospected on the south side of Johnson's mountain, report good prospects and have found gold in paying quantities. There has also been considerable placer mining along the west fork of Cow creek, in Douglas county. Prospectors who have been through that section declare that valuable mines are quite likely to be developed along that creek.

Another Californian, who has traveled the past two summers over Douglas and Coos counties, claims to have discovered a coal mine and a petroleum spring in Camas valley, near the divide between Coos and Douglas counties.

Mr. Gorsline, of Roseburg, has opened a coal mine, located fourteen miles west of this place, that yields a good quality of coal for fuel, and the vein is four feet or more in thickness. Not far from this mine is a spring having indications of petroleum.

The Roseburg papers publish the news of a preliminary survey that has been made to see if water can be brought from the East Umpqua into the Myrtle creek placer mines. The survey proves the scheme to be a feasible one. The proposed ditch will be about twenty miles long, or by making two tunnels the distance can be shortened four or five miles. The canal or ditch will be eight feet wide on top, five on the bottom and carry two and a half feet of water.

These placer mines were formerly worked and were remunerative when plenty of water could be obtained, but should the mining fail, the water can be used for power and for transporting lumber made from the timber growing near, to Myrtle creek, a station on the O. & C. R. R.

I was shown several rich specimens of gold quartz found near the head of the East Umpqua by an old miner, who also showed a rich specimen of native copper found in the same section.

I hear that the quicksilver mines above Oakland have been shut down, owing to the low price of that metal.

Croppings of chrome ore and other metals suitable for paint have been found in several places.

It is claimed by those who have traveled over the different ranges that the mineral belt extends for two hundred miles along Rogue River range, continuing northward in the Cascades.

There is no doubt that enterprise and capital will reap rich rewards if they will develop and thoroughly work the mineral resources of the county, proving that these ranges and their spurs were not made in vain or merely as obstructions to travel and settlement of the county.

E. E. DEMING.

Assessment of Mining Corporations.

EDITORS PRESS:—As we are a little dull on some subjects, that is, cannot see them in the light they are carried out here, I would like to hear from some more intelligent minds on one subject, that in the end I may receive more light.

This subject is, the assessment by our county assessor of mining corporations, at the value of their improvements, and leaving the stock of the corporation unassessed. This appears to be right only in some cases, as I see it, as where they are not dividend-payers. But take the big mines that have net dividends in the year to the full amount of their assessment—is not the stock of such corporation assessable? Has it not the value of a note bearing the same amount in interest? Has it really no value apart from the property? We will take for example a mine here that pays \$5 per share per month, making \$60 per share net, equal to \$600 at 10 per cent, or, in other words, the mine referred to pays dividends to equal ten per cent on \$1,800,000, and is assessed in the sum of about \$240,000. Is that property assessed in proportion to its cash value?

A HAYSEED SUBSCRIBER.

Grass Valley, Nevada Co.

[A former assessor of this city informs us that he assessed the incorporated companies as follows: He assessed all the improvements and then took the aggregate value of the stock at its market value for one or more shares on assessment day, and from this he deducted the improvements, etc., already assessed, and the remainder he assessed as the value of the franchise. This manner of assessing was declared valid, so that the Spring Valley Water Company, mining and other incorporated companies paid in full the taxes due from such assessment. This, it appears, is the only way in which an incorporated stock company can be legally and successfully assessed to its full value.—Eds. Press.]

GLAZED BRICKS are now largely used for both interior and exterior decorations. They are manufactured in Philadelphia and elsewhere in the United States. For this purpose, an ordinary light-colored or red brick is used, and a suitable enamel is produced on the surfaces to be exported. Some colors are very easily obtained. A simple lead glaze on a cheap buff brick makes a good yellow. A manganese and iron glaze is used for black. White and blue are the most difficult to produce, since the red color of the brick must first be hidden by an opaque layer of white before the finishing glaze is applied. Green must be made in the same way.

A NOVEL ENGINE.—A decidedly novel and simple engine is manufactured at Kalamazoo, Mich. It dispenses with piston-rod, crosshead and ways, and is claimed to reduce friction to the lowest possible point. It has an oscillating piston sustained in a journaled bearing, and turns about one-fourth of a revolution to each stroke of the engine, the only friction outside of the shaft to which the rock cranks are attached being a slight pressure on the packing strips to keep it steam-tight.

Calaveras County Notes.

Situation.

The northwest corner of the county is 36 miles southeast of Sacramento city, while the southwest corner is within four miles of being on a direct line east and west with San Francisco. The Mokelumne river on the north divides the county from Amador, while the Stanislaus river separates the county from Tuolumne on the south. The extreme northeast corner joins Alpine. On the west, San Joaquin and Stanislaus counties join Calaveras, making Calaveras almost a triangle 54 miles in length northeast to southwest, and 32 miles across its western border. The county contains 622,000 acres.

Altitude.

The lower plains, from Copperopolis across to Milton, Jenny Lind, Valley Springs, Comanche, Barson and Wallace, average about 400 feet above sea level. Carson, Angels, Vallejo, Douglass, San Andreas, Altaville and El Dorado, 1500 feet. Murphys, Mokelumne Hill, Sheep Ranch, Cave City and Railroad Flat are 2000 feet, while West Point, in the extreme northeast corner, is 2700 feet.

Water Supply.

The melting snow from the lofty Sierra Nevada mountains in the eastern part of the county, pours down a continuous stream of sparkling water, filling the Mokelumne river on the northern boundary and the Stanislaus on the south, thus holding the county in a water embrace, while the Calaveras, San Antonio, Indian Creek, Jesus Maria, the forks of the Mokelumne river and innumerable smaller streams fill every gulch with their limpid streams. Throughout the entire foothill region are many springs pouring out from five to 200 inches of water from nature's hidden reservoirs. Added to these sources of supply, free from nature's board, are the numerous systems of canals, the result of the county's mineral wealth. The early miner found the rich placers of the county extending far up the gulches on the mountain-sides, and when he had reached the summit the mountain proved but an old river-bed, filled with rich gravel, elevated by some three of Nature in her volcanic age. To reach these deposits with water and to give that water the desired fall for pressure, ditches were constructed, which took out the water from the mountain streams at higher altitudes and conveyed the water thence along the summits of the mountains to the mining-fields. Where the streams failed in furnishing a steady supply, great reservoirs were constructed. These ditches are to-day the factor which, in the summer months, causes the hill and valley to blossom as a rose in the hands of the horticulturist, while the mining interest shows a greater degree of activity and prosperity than at any time since the days of old, the days of gold, the days of '49. On the southeast the Union Water Co.'s 90 miles of ditches take 10,000 inches of water from the north fork of the Stanislaus. In addition, their reservoirs hold in store an amount of water sufficient to supply 500 inches a day for 12 months. From these sources of supply their ditches lead to and cover all that portion of the county from Esmeralda on Indian Creek, on the north, to Robinson's ferry on the Stanislaus, on the south, and Murphys, Douglass, Vallejo, Altaville, Angels, Albany Flat and Carson in the center. When needed, this system can be extended to Copperopolis, thus covering the entire southern border. Joining the Union on the north is the Table mountain ditch, taking its 500 inches of water from the San Antonio and conveying it to Sheep Ranch; also the Idea ditch, covering 25 miles of country as it flows to El Dorado, Cave City, Old Gulch, San Andreas and vicinity. The south and middle forks of the Mokelumne cover the country between Railroad Flat and West Point, the middle fork carrying an average of 1000 inches. The Blue lakes, with a capacity of 10,000,000,000 gallons, empty into the south fork of the Mokelumne river, while the north fork has a natural reservoir that can be made to hold 8,000,000,000 gallons of water, more than sufficient for the wants of San Francisco. This system was at one time surveyed for that purpose.

The Clark ditch controls this unequalled system of water-supply, taking its water from the south fork of the Mokelumne, near the Calaveras big trees. It extends thence west over a belt of country 22 miles in width, covering Railroad Flat, Glencoe and Rich Gulch, a stretch of country 32 miles long. When needed, this system can be extended to cover all the county from Valley Springs and Jenny Lind to Mokelumne Hill with a supply of 100,000,000 gallons a day, or, as one time intended, all Oakland, Alameda and San Francisco. Here is water without limit, only waiting for capital to carry its crystal stream to the water-thirsty citizens of San Francisco. Joining this system on the extreme north is the West Point ditch, taking its 400 inches of water from the middle fork of the Mokelumne river at a point six miles east of West Point and conveying it thence to West Point and vicinity. Following the Clark ditch into the valleys is the Mokelumne & Campo Seco Canal and Water Company's ditches. One ditch takes 1000 inches of water from the south fork of the Mokelumne river, 2½ miles northeast of Glencoe; the next, 300 inches, seven miles southeast of West Point; the third, 250 inches, three miles

south of Railroad Flat. Their reservoir near Railroad Flat supplies in addition 200 inches of water for three months. This extensive system of ditches covers and will supply Mokelumne Hill, Campo Seco, Valley Springs, Burson, Wallace and Comancha. Following this is the Laucha Plana and Poverty Bar ditch, taking its water from the main Mokelumne river at Italian Bar, covering Campo Seco, Comancha and Wallace. From this point water will be piped to Clement's, Lockeford, Lodi and Stockton in the adjoining county of San Joaquin. At low-water tide this ditch has 1200 inches of water without reservoirs. Six reservoirs are being constructed, and when completed will give the ditch 5000 inches of water.

Near Milton is the extensive reservoir of the Spring Valley Water Co., covering Milton and all the land below that point. The location, course and extent of these great water systems prove that Calaveras is unequalled in her natural and supplied means of water-supply for all purposes, not only furnishing water to irrigate every foot of good land in her own limits, but having a surplus sufficient for all the plains and cities to San Francisco. In her mountains, reservoirs can be constructed of sufficient capacity to store more water than can possibly be used for years to come. As water is recognized as the great essential in fruit culture, Calaveras may justly claim to have laid her foundation as a fruit county, broad and deep, only awaiting the coming of the experienced fruit-grower to place her in the same front rank with Placer county, the advantages of Calaveras being similar in every respect.

Timber Belt.

The west line of the timber belt begins near Murphys and crosses northeast to West Point; it extends thence east and north to the northeast line of the county, embracing an area of 100 square miles. The vastness of this territory and the wonderful size of these giants of the forest call forth exclamations of surprise and admiration from all who visit this unequalled timber reserve. Many who criticised Horace Greeley when he in his lectures proceeded to show by calculation the vast amount of lumber that could be cut from one of Calaveras county's

Mr. Carty's mill, at West Point, 250,000 feet; Clark's New Era mill, near Glencoe, 500,000 feet. These mills, as a rule, are below the main timber belt. In the belt proper a vast amount of the choicest pine is each year worked up into shakes and palings, while the cedar is made to furnish the ranchers of the valleys with most desirable posts. There is no way of accurately estimating this output, but the large number of teams constantly coming down from the mountains with their bulky loads of shakes and posts prove the extent of this industry. The wood-chopper plies his trade along the lower border, while the charcoal-burner and contractor for mining timber and laggings is

field; sufficient to say that the mineral belt crosses Calaveras county. From the Copperopolis copper mines, on the plains, to West Point, in the mountains, the clatter of the stamp-mill is heard in almost every ravine, while the hydraulic giants still pour out their powerful streams against the ancient river-banks. To Calaveras belongs the honor of giving to the world the largest nugget of gold found in the United States, which was found in November, 1851, at Carson Hill. It weighed 195 pounds troy, with a valuation of \$43,534.

In addition to the numerous gold mines of the county are large hodiea of copper and iron

ing these monsters of the forest. Year after year a steady stream of tourists from our own and foreign lands has visited these wonders until their fame has become as household lore. These *sequoias* are growing about 15 miles northeast of Murphys, and are reached by a daily line of stages. In the center of the grove is located the commodious hotel of the owner of the grove, Mr. J. S. Sperry. In this section all varieties of trees attain an immense size, baring giants in themselves. Sugar pines 275 feet in height with a diameter of ten feet are not uncommon. The size of the surrounding trees has a tendency to dwarf the greater *sequoias*, but when their measurements are taken and the



MAGNOLIA AVENUE, RIVERSIDE, CAL.



A SOUTHERN CALIFORNIA SCENE.

sequoia, thinking he should have confined himself to a description of their majestic beauty, would find themselves naturally falling into the same train of thought, "How many homes can be erected from these monarchs?" "Who can estimate the number of the millions of feet contained in this belt?" The yellow and sugar pine lead in quantity; then follow the spruce, fir and black oak, while the Calaveras grove of "Big Trees" is a forest in itself of *sequoia gigantea*. Tapping this timber on its western border are a number of small sawmills, situated in the ravines leading down from the mountains. John Manuel and McKay Bros. are stationed near the big trees. Manuel's mill has a capacity of 15,000 feet a day of ten hours; McKay's, 25,000 feet a day. C. Crossgrove's portable mill near Murphys cuts 10,000 feet a day; Wiggins' mill on Jesus Maria creek cut 600,000 feet in the season of 1888; Woodcock's mill, near West Point, 800,000;

working steadily up into the belt. By reason of its situation the greater portion of this timber reserve will remain untouched until the railroad penetrates these forests and reduces the cost of transportation to a market sufficient to consume the lumber output of this section. The present market is that of the county alone, which is supplied with lumber at an average price of \$15 a thousand feet. A V-flume, with feeders extending into the different sections, would deliver the greater part of this timber at any desired point in the valleys. Water and sufficient fall for flumes can be secured.

Mineral Wealth.

Calaveras has lost none of her old-time prestige, but is forging ahead. Her mining industries are in a far more prosperous condition than at any time since the days of '49. Space will not permit even an abbreviated account of the extent of the territory and the richness of the

ore. The eastern portion of the county is one vast granite quarry. Between this granite and the slate of the foothills is a section of limestone extending across the county. Black and white marble, steatite, and other valuable building stones are in large supply. Lignite coal, gypsum, and roofing slate, fossils and petrifications can be had for the digging. By reason of the activity in mining, the county has in her mining towns a home market where double the prices can be obtained over those paid in the cities.

Population.

The population in the mining towns is increasing very rapidly, making it difficult to estimate it, but 12,000 will not exceed the number in the county at this time.

Scenic Attractions.

"Calaveras Grove of Big Trees."—Mr. John Bidwell of Chico claims the honor of discover-

space measured on the home lawn, far removed, their size seems incredible. In the north and south groves nearly 1400 *sequoias* are now growing, while numerous fallen monarchs are found at every hand. Through one of these fallen trees the writer rode on horseback for a distance of 200 feet. The Pioneers' Cabin allows the passage of a loaded coach through its base, while far above, its limbs wave their salutation. The New York, with its diameter of 35 feet and height of over 400 feet, will give the stranger an idea, by comparison, of the wonders of the grove. On one stump four sets, or 32 dancers, can trip the light fantastic toe, the diameter being 25 feet. "Smith's Cabin" has an interior of 16 by 22 feet, while the tree, despite its hollowness, extends 340 feet heavenward. "Old Goliah," his neighbor, has fallen, and his 105 feet of circumference and length of 261 feet, mark him a fallen giant.

Scenes in Southern California.

We give on this page photo-engravings of scenes familiar to all dwellers in the southern part of our State. The palms, orange groves, low verandaed house and general nature of the vegetation, sufficiently indicate the semi-tropical latitude of the locality. To the dwellers in the high northern latitudes of our State, nothing could more convincingly indicate its infinite variety of climate than pictures of the snow-crowned, cloud-capped mountains and the hardy vegetation of oak and fir on the one hand and the level, far-reaching vistas of citrus groves, frond-like vegetation and clear skies on the other. Magnolia avenue, Riverside, San Bernardino county, is one of the picturesque and famous drives of that beautiful city. The growth and development of this famous city is one of the marvels of even this marvelous age and country. Less than a generation ago, within the memory of people still young, the place now covered with churches, schools, stores, beautiful mansions, and all the evidences of culture and the highest civilization, was a wilderness whose greatest utility was thought to be in providing sustenance to a herd of sheep. But the mountain streams, which ran to waste and ended their useless career on the plains below, were tapped, their waters utilized, the wilderness was made to blossom as the rose, and taste and skill and irrigation made possible such scenes as those here presented.

THE English Board of Trade reports 509 strikes during 1888, with 83,000 strikers.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Cor. Amador *Ledger*, Dec. 28: The water has been taken out of the Lincoln mine, and work is again being prosecuted, and the mill has been started. Mr. Stewart hopes to be able to run without further interruption.

FATAL ACCIDENT.—Another fatal accident occurred at the Kennedy mine on Christmas eve, the victim being James G. Macdonald. He was working his first shift at the mine, having come from Eureka, Humboldt county, a few days before. He had previously worked to the mill, however, and when the mill suspended went to Humboldt county and engaged in the lumber business. On his return here, he remarked that there were so many cripples in that section, owing to accidents in connection with sawmill and logging business, that he thought he would rather take his chances to the mines. On going to work on the fatal evening, he was sent to the 600-foot level to do something with the water tank, and while engaged in this he fell into the shaft, falling to the water, over 400 feet. The body was soon recovered, but, of course, life was extinct.

El Dorado.

GOOD PAY.—Georgetown *Gazette*, Dec. 29: Judge Edmundson was down from Volcanoville during the snowstorm. He and Mr. Nye have been taking out some good pay this winter from their lavacapped gravel mine.

Inyo.

FISH SPRINGS MINES.—Inyo *Independent*, Dec. 27: There are five mining prospects at Fish Springs. Elliott and "Doc." Grabam have opened up a ledge of gold ore that will pay well. Henry Melone and C. F. Fuller have developed a fine ledge that gives from \$50 to \$80 per ton to gold and there is said to be enough in sight to give them both a "good stake." Commetti, an Italian miner, worked 20 tons a week or so ago that netted him \$800. All over the district old ledges of good paying ore are being found and all can be very easily worked. All the ledges opened so far are by tunnels and two men can work a ledge that may pay them well. Supplies of all kinds can be easily got; there is plenty of water and a fine farming country close to the mines. The distance from the town of Big Pine is but six miles and the locality is one of the pleasantest in Owens valley.

MINE SALE.—Over at Fish Lake an old prospector named Kincaid has lately sold two mine locations for \$15,000. The buyer is Andy Fyfe, a well-known mining man. Kincaid has been prospecting in that locality for many years; he is now getting old, but this sale will give him enough to live the rest of his days in comfort. The ore in the mines carries silver and lead. Beyond any doubt there will be a good deal of activity in mining about Fish Lake the coming spring. The district is just over the California line, in Nevada. Most of the farm products and beef used in the district will be obtained in Owens valley to the neighborhood of Big Pine.

Napa.

MINERAL PAINT NEAR CALISTOGA.—*Calistogan*, Dec. 29: The mining and refining of mineral paint found in this vicinity may develop into a business of great importance and value, judging from recent transactions. James H. Safley, whose residence is on the Knights valley road, four miles from Calistoga, has been aware during the past three or four years that an immense deposit of red mineral paint was on his property, and he has occasionally shown specimens at home and abroad, thinking that perhaps they might attract while come under the eyes of appreciative persons; but not until lately has the paint created sufficient interest on the part of any one to make an investigation. During several days past, parties have had samples in San Francisco analyzing and making experiments, and the result has been so very satisfactory that, to make sure the paint will not pass into the possession of others, they have bonded, for a term of six months, 560 acres of Mr. Safley's land, and paid him a certain amount of money in hand. As soon as the weather will permit, operations will be commenced to ascertain the extent of the deposit, and if it comes up to the expectations of the San Franciscans as to extent and quality throughout, the land will be paid for. Then extensive refining works will be constructed, and the work of mining and refining engaged in extensively. It is said by those men who are first-class judges of red mineral paint, that the Safley paint is superior to any other they have seen. As to the question of quantity, Mr. Safley says there is very little or no doubt that it is all that can be desired, as he has often been over the ground and examined it closely, the deposit being of large proportions.

Nevada.

THE WASHINGTON MINE.—*Transcript*, Dec. 25: Another big bar of gold bullion was shipped to San Francisco this week from the Washington mine, which property is getting better and better with each day's work done on it. Work is being prosecuted in all four levels. The 20-stamp mill is pounding away without interruption on ore that pays about six dollars a ton, and the sulphurets which are saved yield over \$100 a ton. Owing to the size of the ledge, the complete equipment of machinery and the fact that it is run by water-power, the total cost of mining and milling averages but \$2.75 to each ton of ore produced, leaving a profit that ought to satisfy anybody. The upper level has been driven 1260 feet and has three pay shoots, the first extending 322 feet on an ore body two feet wide, the second 73 feet on a seven-foot body, and where the third is being raised 900 feet from the entrance to the level the ledge has widened out to 16 feet. On the second level the shoot now being stoped from shows a length of 200 feet and a thickness of 10 feet. The third level is being driven through pay ore to a point 180 feet ahead to connect with a winze from the second level. In the fourth level and close to the shaft the ore body is eight feet thick. With the arrangements now under way the Washington will be one of the best ventilated mines in the county, and as Under Sheriff Reynolds says, "good ventilation is one of the important requisites of successful mining."

MINING DIVIDEND.—*Grass Valley Union*, Dec.

29: The North Star Mining Co., of this district, has declared a dividend (No. 5) of 50 cents a share, amounting to \$50,000, payable on and after the 30th inst. This will make \$250,000 in dividends paid by the new company.

OUT OF SUPPLIES.—*Transcript*, Dec. 29: At the IXL mine on the south fork of Poorman's creek, there is a scarcity of provisions for the men and of shoes and dies for the mill, all on account of the big storm which has prevented getting these things over the road from the base of supplies to the mine. The scarcity has necessitated a temporary laying off of most of the force, but everybody will be at work again as soon as some "grub" can be taken over from Washington, which is five miles this side. The mine itself is all right. Men who have worked there say it is going to be a great producer by next summer when everything gets fairly under headway. They report that the ledge varies in thickness from 10 to 30 feet and has an average width of 17 feet. They say it mills over \$10 a ton as far as tested. If a ledge of that size and as easily extracted averages \$6 a ton, there is a fortune in it for the owners.

A GREAT MINE.—"The Idaho mine of Grass Valley is a great property, but let me tell you that the California mine of Graniteville bids fair to make just as good a record," said a mining man who recently visited some of the claims in Eureka township. The California has a very large ledge of ore that is richer than the most extensive deposits and as the ledge is followed it is improving in every way. Supt. Foley, who is in partnership with Mr. Bohannon owns the property, keeps persistently but quietly turning out the riches. He doesn't say much, but he wears a contented expression that cannot be misinterpreted.

THAT RE-ORGANIZATION.—*Tidings*, Dec. 26: A recent proposed re-organization of the Brunswick Mining Co., operating in this district, the following explanations are made: The holders of the judgment against the company are to receive the entire capital stock of a new company to be organized under the laws of California for their judgments against the present company, at the rate of \$25,000, or five cents per share paid (still leaving 95 cents per share assessable). The holders of the entire capital stock of the new company agree to exchange share for share of the old for the new on the payment by the old of five cents, and the money received from the voluntary assessment on the old, less expenses, to be donated to the new company for the development of its property. All lapsed stock goes to judgment holders. The entire capital stock of the new company is to be deposited with H. R. Lounsbury, New York, until Aug. 1, 1890. Up to this time only the judgment holders' stock will be traded in, the object of pooling the entire capital stock being to prevent the throwing of large blocks on the market and depressing prices.

ANOTHER BIG DIVIDEND.—*Tidings*, Dec. 30: The North Star M. Co., operating in this district, has declared dividend No. 5 of 50 cents a share, aggregating \$50,000. This makes \$250,000 in dividends paid by the North Star under the present management. And this mine was shut down years ago, "worked out!" Yet it has within three or four years been reopened, supplied with a hoisting and pumping plant and 40-stamp mill second to none in the State, in addition to paying a quarter of a million in dividends! Between 150 and 200 men are given employment. The Empire, Omaha and Hartley are also shining examples of "worked-out" mines.

COE MINE.—*Grass Valley Union*, Dec. 31: The owners of the Coe mine received no information yesterday from Mr. Craig, of Deervo, who has a bond upon the property which expires to-day, and they were of the opinion that he would not comply with the terms of the bond, and that they will again take possession of the property. In that case it will not be long before arrangements will be made for conducting regular operations in the mine, and in the meanwhile the pump will be kept going to prevent the mine filling with water.

TWO BITS A PAN.—*Transcript*, Dec. 27: The workmen digging to bedrock to make a foundation for the north abutment of the new Main street bridge have struck gravel that pays two bits to the pan. Along about 1860, John Williams, grandfather of ex-Postmaster Wallace J. Williams, ran a tunnel in north from Deer creek at about that point and drifted out considerable gold. He had to quit before the deposit was worked out, because of the sinking of Maio street which was overhead. The Manzanita ravine which now has its dumping-place farther east came down that way in early times, it is supposed, the theory being that the point where the Union hotel, Lane's livery stable and adjoining buildings now stand was once a low flat and subsequently filled up with the natural wash. There is a chancel of pay gravel even as high up as a few feet over the ground upon which the undertaking establishment of W. C. Groves stands.

OMAHA MINE.—*Grass Valley Union*, Dec. 31: Everything is going on satisfactorily at the Omaha mine, except that the bad weather has interfered with the putting down of the water-pipe line to the Lone Jack shaft for hoisting purposes. As stated several days ago, a splendid body of ore is showing up in the No. 10 and No. 11 drifts, which from its size promises to give permanent and profitable results. The Omaha has about reached the point where dividends can be paid, but they are postponed for the present, owing to the expenditures being made for surface improvements.

Placer.

IOWA HILL.—Cor. Placer *Argus*, Dec. 28: The latest news from all the mines in this vicinity and on the Upper Divide is encouraging. Fair & Davis have 35 meo at work on the Pioneer quartz mine, near Damascus, and keep 15 stamps running most of the time on rock that gives good dividends to the owners. A lower tunnel is being run to cut the ledge at a greater depth. C. Hoffman reports about 40 men at work at the Red Point mine taking out gravel that must pay well if Mr. Hoffman's good spirits are any indication. Chas. F. Reed, owner of the Drummond quartz mine at Cottage Home, passed through town on Friday last on his way to the mine. About 25 meo are now at work and the force will be doubled during the spring. The Huntington mill crushes from 25 to 30 tons per day with good results. Mr. Reed is well pleased with his investment in Placer county. The famous old Mountian Gate gravel mine at Damascus has been bonded to the same French syndicate that owns the Red Point mine. The Mountain Gate has been one of the richest mines on the Divide. Enough of the old

blue channel still remains unworked to warrant the new owners putting in pumping machinery, or to run a new and lower tunnel to drain the mine. The French company have abundant capital to do either, and have intelligent engineers in their employ who will bring back the old Mountain Gate to its former position as one of the best paying mines in Placer. It is rumored that the same company have bonded other claims in the same vicinity on which work will be commenced in the spring. Ross Browne, the mining engineer, has been surveying and taking the levels on rim rock and channels on the Forest Hill Divide, and it would not be a surprise if you should hear that the French syndicates had got hold of some of the rich gravel mines in that district. The Morning Star gravel mine, at Iowa Hill, has been bonded to a company represented by Mr. J. Hammond, who is at present working the mine under his bond. The main tunnel is being driven ahead 500 feet; when that work has been completed a larger force of men again be put to work taking out gravel and the mill again be run on full time. E. West has charge of the work. Tom Dick and the Schmidt boys are running a tunnel on the old McCall mine at Elizabeth tow. They have started an upraise and expect to break through before New Year's. They have christened the claim the Emma mine. The Huntington mill at the Horman mine, at Wisconsin Hill, is crushing 12 to 15 tons of rich gravel per day. Another mill is on the way to the mine, but it will not get there before spring unless the roads improve.

SUNNY SOUTH.—Cor. Placer *Republican*, Dec. 25: Five miles from Michigan Bluff at the head of a tributary of El Dorado canyon lies the little town of Sunny South. It depends entirely upon the Hidden Treasure mine for its existence, but since it is "built upon a rock" no one is apprehensive as to its future. The Hidden Treasure mine has been worked for about 13 years and is now operated through 8300 feet of tunnel, through a slate formation, by drifting. The pay gravel is white quartz. The bedrock is slate varying in color from white to black. The mine is timbered throughout with spruce and pine. The gravel is washed by water supplied by the mine. The cars are drawn into the mine by horses, and as the cars come out of the mine loaded their contents are dumped through a chute to the washing floor, where they are washed into sluices by a stream of water under a pressure of 20 feet. After being washed the gravel passes through two sets of sluices lined with quartz boulders and worn-out car wheels. Considerable quicksilver is used in the sluices.

Shasta.

OLD DIGGINGS.—*Redding Free Press*, Dec. 23: S. O'Neil of Old Diggings informs us that he has a contract to run the main tunnel on Haskell, Meyers & Co.'s mammoth mine. Also that the Hart & Day mine is running 15 stamps and shipping a carload to Vallejo Junction every week.

A SUCCESS.—*Shasta Courier*, Dec. 26: John Bowder has made a success in his management of the old Banghart mine on Mad Mule creek, nearly \$3000 having been taken out in a few months. If there was a good supply of water on that claim a carload of gold could soon be extracted.

Siskiyou.

SALMON RIVER ITEMS.—Cor. Yreka *Journal*, Dec. 25: The weather was quite cold on the evening of the 15th inst., the mercury reaching 20 above zero, the coldest of the season. The snow ranges from six inches to a foot deep on the river bars, and is disappearing rapidly under the influence of the hot sun. On the mountains the snow is six or seven feet deep. The placer miners are getting ready for business in the spring, when nearly all baying claims will make good wages. The Golden Ball quartz mill is working 12 stamps, one battery being buog up for repairs. The ore crushed at present is the best milled in this district for a long time. The more the mine is developed the better showing it makes. Rollin & Co., with two arastras, frozen up at present, have plenty of ore on the dump to grind as long as water lasts, which good judges say will average not less than \$100 per ton. Sheffield's quartz-mill has not been started yet. He expects to start up soon, with 200 or 300 tons of ore, which prospects very well. Ex-Lieut. Gov. Daggett is prospecting the Black Bear mine with a fair chance of bringing it up to its old standard. Ned Roberts has found a good ledge about one mile above the Golden Ball on Eddy's gulch. It is said he has, ore to sight in the tunnel that will yield \$2000 per ton. Bully for Ned! Harry Welker & Co. have a fine prospect below Tanner's Peak. They have run 40 feet to the ledge and find good-paying ore all the way.

PLACER AND QUARTZ.—*Yreka Journal*, Dec. 25: From Koon Nothing creek we learn that the quartz mines are all turning out exceedingly well, with prospects of improvement as the various ledges are more fully developed. The Gold Run mine of Radefinger & Co. pays from \$60 to \$80 per ton, and employs from six to eight meo in the mine and mill. The Koon Nothing mine has been yielding very good pay, and the mill is kept running steadily. The Wolverine mine has been shut down for the present, owing to the ledge being too wet to work to advantage. As soon as it dries out after the heavy storms, work will be resumed again. The cold weather since the late storms freezes the ground and checks the flow of water, to prevent much work at placer mining, but when a change to warmer weather occurs, there will be an abundance of water, owing to the extensive supply of snow on the mountains. The frequent warm spells during winter will give miners a better chance this season than for many years to mine successfully, and in the spring they will be favored with a still better chance of doing well. The hydraulic mines will also have an abundance of water to run several weeks longer during the spring and summer, as the snow already on the mountains will be sufficient to last until midsummer, with a certainty of considerable more snow during January and February to pile up an additional amount. Radefinger & Co. have built a fine new ditch at their mine on Koon Nothing creek, which will enable them to run their quartz-mill all year round. They expect to start the mill again in March, when the new ditch will be ready for constant use. The Centennial Co. are pumping out their claim again, since being filled up by the heavy storm of two weeks ago, and have all the water out except about 10 feet. The boys do not entertain much hope of being able to mine during the winter, but concluded it would do no harm to start up the

pump run by the water-power of the river. Should no great storms occur hereafter to raise the river, they may be able to start working again in taking out gold, provided the weather does not get cold enough to freeze the water in the pit.

NEVADA.

Washoe District.

GOULD AND CURRY.—*Virginia Enterprise*, Dec. 28: On the 200 level the southwest drift has been extended 20 feet; total length, 250 feet. Formation, soft porphyry. On the 400 level west crosscut No. 2 has been extended 38 feet; total length, 138 feet. Formation, quartz.

BEST AND BELCHER.—On the 625 level east crosscut No. 1 has been extended 28 feet; total length, 78 feet. Formation, porphyry and clay, with streaks of quartz. On the 1000 level east crosscut No. 1 has been extended 15 feet; total length, 56 feet. Formation, hard porphyry.

ALTA.—Are still sinking the winze in the ledge below the 925 level. The stopes between the 825 and 925 levels are looking well, and the mill reduces daily about 45 tons of ore. Have just made a large shipment of concentrates to Salt Lake City.

YELLOW JACKET.—Are shipping an average of 60 tons of ore daily to Brunswick mill. The west drift on the 500 level is out 880 feet; face in porphyry. Crosscutting east and west from north drifts on the 800 and 900 levels.

HENDRICKS.—The hoisting machinery has been thoroughly repaired and is now as good as new. Work will be resumed in the shaft when the roads are again opened.

JUSTICE.—The 825 level north drift, advanced 17 feet during the week; total, 115 feet; face in fair-grade ore. The north drift, 622 level, is out 470 feet, the face in low-grade ore and showing some moisture. The 490 level stopes are looking and yielding about as usual. Shipped to the mill during the week 247 tons of ore; average battery assays, \$22.62.

KEYES MINE.—Proprietorship in a chaotic condition.

OCCIDENTAL.—Too much gypsum.

SAVAGE.—Are extracting ore from the 400, 500, 600 and 750 levels. During the week 455 tons of ore have been milled, the average battery assay of which was \$21.58. Have bullion on hand and at the mill amounting to \$22,315.50.

HALE AND NORCROSS.—They are extracting ore from the 500, 600, 700 and 1200 levels, and also from the 1300 level upraise. During the week have milled 1078 tons of ore; average battery assays, \$19.13. Have bullion on hand and at the mill amounting to \$49,467.24.

SCORPION.—On the 500 level the new east crosscut from the south drift was advanced 56 feet; total, 256 feet; face in porphyry, showing streaks of quartz.

CHOLLAR.—The north lateral drift, 750 level, is out 744 feet; face in quartz and porphyry, giving low assays. The north lateral drift, 930 level, is out 365 feet; face in porphyry.

POTOSI.—Timbering the south lateral drifts on the 650 and 750 levels is nearly completed. The east crosscut, 560 feet north of shaft, 930 level, is out 166 feet; face in porphyry.

EXCHEQUER.—The 500 level east crosscut on the north line is out 46 feet; face in quartz and porphyry.

NEW YORK.—Owing to repairs being made to surface machinery, very little work has been done in the mine the past week.

ALPHA.—The west crosscut 100 feet north of shaft, 500 level, is out 373 feet; face in porphyry. The north lateral drift, 600 level, is out 62 feet; face in quartz, giving low assays.

SILVER HILL.—The 260 level east crosscut, 790 feet north from shaft, advanced 15 feet through porphyry; total distance from shaft, 875 feet. North-east crosscut, 430 feet from shaft, advanced 15 feet through porphyry and clay; total distance from shaft, 480 feet.

WARD COMBINATION SHAFT.—East drift on the 1800 station is out 113 feet; face in porphyry.

JULIA CON.—The northwest drift from the 1800 Ward station is out 131 feet; face in clay and porphyry.

CHALLENGE CON.—The joint Confidence and Challenge west crosscut from the 300 level is out 86 feet, 20 feet having been added during the week. The face shows a mixture of quartz and porphyry.

CROWN POINT.—The 600 third floor northeast drift is out 64 feet. Shipped to the mill during the week 847 tons of ore, the average battery assay of which was \$17.67 per ton.

BELCHER.—The 1200 level No. 2 east crosscut was extended 67 feet during the week, making its total length 370 feet. The 200 south drift is out 123 feet.

OVERMAN.—Extracted 185 tons of ore and shipped 205 tons to the Vivian mill.

CALEDONIA.—At a point 313 feet in the south drift have commenced west crosscut No. 3 and extended the same 38 feet. Formation, vein porphyry.

CON. IMPERIAL.—West crosscut No. 2 from the 300 level north drift is out 60 feet, having been advanced 20 feet during the week. The face shows a mixture of quartz and porphyry. The north raise from the same level is up 70 feet, 14 feet having been added during the week. The top is in low-grade quartz.

Columbus District.

CANDELARIA.—Cor. Ioyo *Independent*, Dec. 27: There is a rumor in camp that the Candelaria Mill & Water Co. has bought the Holmes and Northero Belle properties. Mr. Sunderland is now his way from New York to San Francisco; he is the manager of the C. M. & W. Co. It is said that Mr. Westerville, the resident superintendent, has demanded the possession of the Holmes from Mr. Girard, the agent for the Holmes. Mr. Girard says the Holmes is sold but he has not received orders to turn the property over to the new owners. There are over 100 Chioamens working at Columbus for the Pacific Salt and Borax Co. They ship about 500 tons of borax per month. Teals Marsb has also started up. The Mt. Diablo will shut down for a week to give the men rest and overhaul the machinery at the hoisting works. Their mill at Sodaville is running on ore from the Columbus Con. mine. Thomas Harrington, formerly with Given & Ingalls, of Bishop, is foreman of the Columbus mine. Considerable chloriding is being done on the Potosi, the property of T. Reddy, and other claims. There

are 14 men working on the Garfield mine. Mr. Hooper, the superintendent, has gone to London and it is understood that on his return they will put on about 30 men. If the Holmes is sold there will be considerable money expended here. Mr. Sunderland has ordered the resident superintendent to examine the Holmes and send him a report to San Francisco what the probable cost will be to put the Holmes property in good working order and what it will cost to get out 30 tons of ore per day.

Eureka District.

ADAMS HILL MINES.—Eureka *Sentinel*, Dec. 28: Some of the mines on Adams Hill we learn are looking well. There are seven tributaries working in the Silver Lick, all of whom are making good wages. Frank Roose is getting some good ore out of the Rio Members. Wm. Sanchez is mining some rich ore in the Lone Pine. Al Hageman is prospecting and living in hopes of getting rich. He has good chances ahead of him and is very much encouraged with a vein of lead ore in sight in the Ida May mine. He is finishing his assessment work on the May lode, Johnny McNorton and the Laird brothers are taking considerable heavy lead ore from the Bullwhacker mine, which they are shipping to Salt Lake. They are making good wages.

New Pass District.

CLOSING DOWN.—Reese River *Reveille*, Dec. 24: Ramdohr and Starrett Bros. have shut down the mine at New Pass for the present and discharged the miners. Dennis Scully, Jim Canwith, George Francis, Bob Crawford and John McCormick arrived here yesterday, while those living in Battle Mountain have departed for that place. It is not known when they will begin operations again.

Ploche District.

FURNACE.—Record, Dec. 21: The furnace shut down Thursday afternoon, owing to a lack of fluxing material. It will depend on the state of the weather as to when it will start again. For two weeks past it has been impossible to bring in either ore or supplies from the outside, and the furnace during that time has been run on material accumulated before. After three weeks of almost uninterrupted storm, appearances indicate further bad weather. On Thursday, the concentrators at the Reduction works after a lay-off of several weeks for alterations, started on Half Moon ore and will run until the ore now accumulated is finished.

TRAMWAY.—That portion of the Half Moon tramway running from the Raymond Shaft along the hillside west of town to the vicinity of the schoolhouse is all graded, and rails are laid on a good portion of it; cedar ties are used and the track is built the same width as the old Bullionville road, and some of the cars formerly used on that road will be utilized here. The completion of this portion of the tramway will greatly facilitate the delivery of ore and supplies at the furnace when next it runs.

Sylvania District.

SALE.—Cor. Inyo *Index*, Dec. 24: John Bushard, who was in town a few days ago from Palmetto district, reports the sale of the Kinkead mines at Sylvania district to S. F. parties for \$30,000. Fifteen thousand was paid in cash, balance on completion of sale. The sale was made by Andy Fyffe, and reduction works will be put up this coming spring. These mines are in Esmeralda county, Nevada, about 60 miles east of Big Pine. A new wagon road will be built through the southeastern part of Deep Spring valley, connecting with the Ashmore toll road to Big Pine.

Tuscarora District.

ELKO CON.—Tuscarora *Review*, Dec. 27: The crosscut at the bottom of the incline has been extended five feet; rock very hard.

BELLE ISLE.—West crosscut from the north gangway, 350-foot level, extended 14 feet. West crosscut from south drift, 250-foot level, extended nine feet; face is all in low-grade ore.

NAVAJO.—The stopes above the 150-foot level continue as at last report. The crosscut near the station has been cleaned out and a crosscut from the north drift advanced four feet. Mill now running on Navajo ore.

GRAND PRIZE.—400-foot level: Winze from south drift suok 15 feet, bottom in low-grade ore. West drift from north crosscut extended 14 feet. North crosscut, 500-foot level, extended 11 feet through a very hard formation.

NEVADA QUEEN.—The south drift from Commonwealth has been extended 22 feet, the whole face being ore, some of which is high grade. Joint crosscut from 600-foot level, North Belle Isle, is being pushed toward the vein as fast as possible.

NORTH BELLE ISLE.—Stopes above the 300, near Quee line, are without material change. The concentrator is running as usual.

NORTH COMMONWEALTH.—Third level: Joint crosscut east has been advanced nine feet; continues to show some ore in the face. Water is not so strong as at last report. East crosscut from south drift has been extended 17 feet without material change.

DEL MONTE.—No. 2 west crosscut on the first level has been advanced eight feet. The face of the crosscut is low-grade ore and looking very favorable. The work of cutting out second level station is about complete; will have the chairs in to-day. Drift will be pushed into the ore as fast as possible.

COMMONWEALTH.—300-foot level: North gangway extended 17 feet. The stopes throughout the mine look well; 425 tons concentrator ore have been sent to the concentrator; average \$15.83 per ton. Concentrates average assay for the week, \$249.79 per ton. Average assay of first class, by car sample, \$289 per ton, put in ore bins at Union mill. Some repairs needed at the mill are being made preparatory to starting on the 1st.

ARIZONA.

GOLD BULLION.—Prescott *Miner*, Dec. 30: Wm. H. Faulkner, of the Quartz Mountain Mining Co., to-day shipped a \$2000 bar of fine gold bullion, the result of 40 hours' run of their mill. Parties who came through Copper basin yesterday say that the smelter there was in full blast. Frank A. Patty, foreman for J. R. Liston of the Old Reliable mine in the Bradshaws, says the mill is running to its full capacity, while the mine is in a splendid condition, showing up large quantities of good ore. A pack train of three animals came in yesterday afternoon from the Bradshaw mountains, loaded down with bullion from the Crowned King mine. The value of the bullion is not stated, though it is esti-

mated by those who have seen it to be worth \$74,000 or more. The Fortuna mine near the lower dam has been sold to a Phoenix blacksmith named Vasquez. E. S. Bennett, the hydraulic engineer who accompanied the Bates party to Stanton, came in on last night's stage. He has made extensive investigations of the placer grounds of the Electric Placer Co., and expresses himself highly pleased. Geo. E. Brown returned from an official visit to Cherry creek yesterday, and says the Mockingbird mill is crushing 20 tons of ore per day. J. R. Liston gives employment to eight or ten men at the Old Reliable mine and the Del Pasco mill. The Rapid Transit, owned by Jacob Henkle, in the Bradshaw mountains, is well opened up, and shows a large body of fine ore. Superintendent M. R. Kiley came in to-day from the Ryland mine at Minnehaha flat, with a large shipment of fine gold bullion, the product of the Ryland mill. The value is supposed to be away up in the thousands. A clean-up will be made at the Mockingbird mill to-day or to-morrow. Parties who have recently visited this property say that the yield is even larger than was anticipated. Messrs. Palmer, Martin and Goodfellow shipped their supplies out to Martinez to-day, and the latter two will leave next week to commence work on the Highland Mary mine. W. H. Harlan is working the Wild Cat claim, on the Hassayampa, and is getting good ore, which he will run through the Howard mill in the spring. J. K. Hall was in from the Lynx Creek hydraulic works to-day. He says that there are six men employed there in washing rich gravel. They have been running now for two weeks, but have not yet made a clean-up. A clean-up was made at the Mockingbird mill last week which proves highly satisfactory. The result was even greater than anticipated by Mr. Ried or Superintendent De Kuhn. The ledge of the mine is five feet in width, and all the ore taken from it is run through the mill without sorting.

NOTES.—Prescott *Courier*, Dec. 29: Wm. A. Finn has gone to Bradshaw district to start work on his Tiger claim. A. C. Gilmore and Wm. Murphy, just from the Oro Bella section of Bradshaw, say that mills and mines are doing first rate. Robert Dougherty has returned from a long prospecting trip to the Harcuvaru mountains. Says he saw nothing to compare with this mineral belt. There's another Silver King complication. Company refuse to pay Mr. Rubert balance of purchase money, over \$7000. Mr. Baer, one of the company, is here from the East, so we hope for a settlement of questions. Mr. O. F. Place, president of the Crowned King M. & Co., does not want any saloons near the company's property, so he has enjoined Sheriff O'Neill from issuing license to a Mr. Patrick.

COLORADO.

NEW ORE CONTRACTS.—Aspen *Times*, Dec. 22: It was stated last evening on undoubted authority that the Aspen and Compromise mines had completed contracts for their January output. As near as could be learned, the contracts are with several different concerns and call for an aggregate of 150 tons per day from each property. This figure is larger than the average for the two mines before the shutdown and will require the employment of a greater number of men than were formerly engaged. The Mineral Farm continues to look well. It is reported that some ore has been found in the Romulus. The Edison improves rapidly. It is opening up at two points and both ore bodies give promise of being bonanzas. New developments have been made in the Silver Bell during the past few days that show the ore body to be even larger and richer than has heretofore been supposed.

A NEW PLACER BONANZA.—Denver *Republican*, Dec. 26: A company is to be shortly organized with \$300,000 capital to purchase 320 acres of placer ground on the Tyler estate, embracing 3 1/4 miles on Boulder creek and 2 1/4 miles on Beaver creek just above their junction. Forty acres of ground has been worked above the Tyler estate for 15 years, and it has yielded largely in gold, even at the present time paying excellent wages to the parties working it under a lease. At the junction of the creeks about 2 1/2 acres has been "pawed over," with the result that \$40,000 in royalties have been paid. Bedrock on this small space has never been reached. The new company will work thoroughly all the ground on Beaver creek to the upper line of the estate, and on Boulder creek to the 40 acres which is now being worked and has proved so rich in the past. The area to be purchased is virgin ground, and for some reason has been heretofore supposed to contain very little gold. Recent prospecting has, however, demonstrated that the dirt is equally rich with that found at either place where mining has been done. W. C. Lotthrop & Co. obtained a bond upon the property some little time ago, and commenced careful investigation as to the value. They got I. B. Lambing, of California, a placer miner of 40 years' experience, and reputed to be one of the most conservative experts in the United States. Mr. Lambing visited the property and spent several weeks in its thorough examination. He returned late last week and reported in substance as follows: That there are 300 acres of placer ground on both creeks. That the Beaver creek dirt for the whole distance of 2 1/4 miles will average 73 cents to the cubic yard, and that the 3 1/4 miles on Boulder creek will average 61 cents to the cubic yard. That there are 1000 inches of water, with a dump of 124 to 300 feet to the mile. That it will require 20 men 20 years to work the ground thoroughly. That the total product, all allowance being made for waste, cost of sluicing and other expenses not including labor, will be very little less than \$2,000,000. Lotthrop & Co., S. H. Baker, Esq., being the silent member of the firm, are acting upon this report and will organize in a short time a syndicate, which will contain at the most three other gentlemen. They will ground-sluice the property and work for awhile in this manner. Subsequently they will put in the giants and tear down a great amount of gold-bearing dirt and rock. The expectation is confident that \$40,000 will be taken out the coming season.

DAKOTA.

NIGGER HILL TIN.—Deadwood *Pioneer*, Dec. 25: Chas. Finch, superintendent of developments on the claims of the American and Cleveland tin companies, is in the city, and from him we learn that more ore has been uncovered and taken out the last three months than during all the former years of developments. Three claims, Isabel, Tolo and Columbus, heretofore considered worthless, have de-

veloped into as good, if not better mines than the Cleveland. Reduction works of some kind will be in operation before the close of the year 1890.

SYNDICATE SMELTER.—The Syndicate smelter will blow in for another run immediately after Christmas. Contracts were made yesterday for fifty tons of Ross-Hannibal ore, and for an equal amount from the Tornado, Harmony and Double Standard companies. Pyrites will be obtained from Galena.

IDAHO.

OLD ABE.—Charles Sinclair and partners are running a 200-foot tunnel on the Old Abe on Elk creek; a distance of 50 feet has been attained with most satisfactory results. The vein is six feet wide and averages well in silver and lead.

MAYFLOWER.—J. C. Rasberry and J. W. West are developing the Mayflower claim on Pine creek. Their incline is down 30 feet, in the bottom of which is a body of good concentrating ore, one and a half feet in width. The Mayflower is a most encouraging prospect.

BEAVER DISTRICT.—The wonderful discoveries on Sunset Peak are regarded as among the most important made in any portion of Cœur d'Alene, and the coming season will be one of much activity in and around Carbon Center. Notwithstanding the great elevation of the mines, work is progressing rapidly and will be continued during the winter.

SITTING BULL.—The Portland M. Co., with W. H. Pettit as superintendent, keep a force of men employed on the Sitting Bull getting out ore, and teams are constantly employed in hauling the product to the railroad for shipment. The hoisting plant and other machinery which arrived over two months ago will be put up early in the spring.

CUSTER.—The Porter Bros. and W. H. Claggett are steadily working the Custer mine, and those familiar with its development pronounce the property one of the richest in the prolific district to which it is located.

PONY GULCH.—Success appears to crown the efforts of Supt. C. Kraus of the Fay Templeton mine, who keeps 20 men employed day and night on that property. The quality of the ore extracted is most excellent and the quantity in sight equally satisfactory. The mill is running uninterruptedly.

THE ELKHORN MINE.—Boise *Statesman*, Dec. 24: Mr. E. H. Hesse, who has recently been engaged in making surveys of the famous Elkhorn mining property in the Boise Basin, gives a very encouraging account of the present condition and future prospects of the Elkhorn and adjoining properties. The old works on the original Elkhorn were abandoned many years ago on account of the accumulated water, for which the miners of that day had failed to provide means of drainage. The lode where left had proved very rich, over half a million dollars having been extracted during one short season's operations. During the past two years, Mr. Hugh Turner has been engaged in running a lower tunnel with a view to tapping the old Elkhorn lode. This tunnel is now in some 1200 feet, having cut through four parallel veins in that distance. These veins all show good bodies of paying ore, from one of which Turner realized some \$25,000 in a few weeks. At present the property is bonded to a Boston company, which is pushing operations on a healthy scale. At the end of the tunnel named, a double compartment upraise is being prosecuted with a view of tapping the bottom of the old works on the Elkhorn. The new 50-stamp mill to be built next season will be run by water-power, as will also be the electric plant to light the mine and mill. Only a limited force—some twelve men—is now employed. The only means of crushing ore at present is the five-stamp mill used by Mr. Turner. The mine is situated on Elk creek, about ten miles above Idaho City.

THE BUTTERCUP MINE.—Ketchum *Keystone*, Dec. 21: In consequence of the damages occasioned by the snowslide which occurred last week at the Buttercup mine on Willow creek, Supt. Childs has suspended further operations at the mine until spring. The closing of work during the winter will no doubt be quite a drawback to the development of the mine, but the casualty which has caused the cessation of work for the present was beyond the power of human effort to avert.

MONTANA.

RUBY DISTRICT.—Butte *Inter-Mountain*, Dec. 28: In the Lowland district operations have been suspended for the winter, though considerable prospecting and reprocessing is being done by quite a number. The Amazon is just at present the only mine in operation in the district. The ore is shipped to Butte and is like all the ore in that locality, gold in character with a sprinkling of silver. There is no excitement concerning the mines as in old times. No such excitement disturbs those now busily engaged in developing this country. The best known mine and most prominent is the Ruby. The depth of the shaft is 100 feet, but the company have confined themselves to stopping from the 50-foot level to the surface. That is about exhausted. It is stated by parties who have worked it that the company has netted fully \$100,000 from this amount of ore worked.

THE LEXINGTON.—The Lexington shaft is pushing on to the 1500-foot level and is the deepest perpendicular shaft in the whole State of Montana. More attention is paid to the sinking of this shaft than the sinking that is being carried on in all of the mines of Butte, as on the results, when that crosscut connects with the lead on the 1500, will depend the future of deep mining in this district. Many assertions have been made by many of the prominent mining men as to the continuity of ore bodies in depth. Some claim that the leads become richer as depth is attained as in the Mountain View, while others that the deeper, the more base becomes the ore and that it will run ultimately into iron or barren rock. Thus far the former assertion seems to be more correct, as is witnessed by many of our great mines, though more particularly the copper ones. This company deserves great credit for being the first to commence sinking to any great depth and after reaching the 1000-foot mark to keep right along without interruption. Edmond Williams, at the mouth of Park canyon, has his tunnel in 175 feet. It will be continued in 250 feet farther, when it is expected it will tap the lead. The Iron mine in Park canyon has lots of ore on the dump to answer all demands made upon it. It is used entirely for fluxing. It is reported that the Butte Reduction Works will shortly start up their blast furnaces that have so long lain idle. The concen-

trator and calciners are running at their full capacity. The Mountain View is having some difficulty in getting rid of its ore. The mine is now compelled to lay some of the boys off every once in a while on account of the chutes being full. The East Gray Rock continues shut down owing to part of the machinery of that mine being used at the Silver Bow. Remarks have been current that the Anaconda Co. intends to shortly open the Anaconda mine. The Odin has again suspended operations. The pumps are hoisted to the surface. The Plutonia has also thrown up the sponge. It was operated by Messrs. Haupt & Rafferty. Dr. Larkin is working eight miners in Horse canyon on his claim. The lead has been encountered and looks very promising. Robt. Tait, the millwright who constructed the Champion mill, states that the mill will not be able to start till some time in February. There is shipped daily from the five Chamber syndicate of mines, the Mountain Consolidated, Green Mountain, Wake Up Jim, Modoc and Matte, about 1500 tons of ore, which is hauled to Anaconda by 70 or 75 of the Montana Union cars.

THE KEYSTONE.—New Northwest, Dec. 26: The report of an important strike in the Keystone has been verified. The dip of the lead brought it into the shaft at 112 feet, and it has straightened to such an extent that the working will be on vein matter for 20 feet at least. The ore body is about four and a half feet wide and sample assays go from 40 ounces up.

THE CHAMPION.—Regular, though not large, shipments of ore continue to be made, enough to pay the running expenses of the mine pending the completion of the mill. With the exception of a part of the machinery, all the material for the mill is now on the ground.

THE FRANKLIN.—The men who recently took the contract to extend the Franklin tunnel 500 feet had made 75 feet of the distance last Sunday. The development thus far on the contract has been a stringer of very fine ore and a change for the better in the character of the formation.

OREGON.

POWDER RIVER.—Union *Scout*, Dec. 21: Powder River is again attracting the attention of our miners and J. G. Lewis will leave for the East to perfect the organization of the Powder River Flume and Mining Co. on the three miles of the river owned and controlled by the J. G. Lewis Co. Owing to the very and unusual low stage of Powder river last summer only the rocker could be used, yet every one working realized good wages and it is now known that M. Ferri, doing assessment work for the J. G. Lewis Co., realized over \$1000 in three months.

SPARTA.—Cook & Younger, the Sparta Rustlers, have uncovered some very rich free gold and sulphure ore on their Bismarck and Opulent mines belonging to the consolidated New Golden Era group adjoining the Gold Ridge group on the west. The Ollie Woodman, belonging to this group, shows three feet of high-grade ore and the incline shaft will be sunk 50 feet this winter and levels run at this depth. The ore from the Ollie Woodman shows \$18 in gold by free amalgamation and \$21 gold in sulphurets to the ton. They have suspended work on their rich free gold property on East Eagle creek and will actively develop the consolidated New Golden Era group, which is now conceded to be one of the most promising group of mines in the Sparta district.

UTAH.

A STRIKE IN BLUE LEDGE.—Park *Record*, Dec. 29: The Ontario bullion product for the week was 29 bars, containing 17,047.55 fine ounces of silver. The bad condition of the roads interfered with ore hauling the past week. The Crescent has not yet resumed shipments of first-class ore. Air connections between No. 1 and 2 levels have been made and the rich vein is being explored to better advantage. The Woodside's ore shipments will be larger than ever soon. During the week the Mackintosh sampler received and forwarded 394,450 pounds of Ontario ore; 174,640 of May Flower No. 7 leasers; 67,350 of Daly, and 24,180 of Woodside ore; 66,700 pounds. A discovery of a deposit of lithographic stone is reported to have been made recently in the hills below town. The Nevada-Northland leasers started this morning to ship high grade ore to the Mackintosh sampler and the first lot will be fifty tons. Work continues at the Creole No. 2, notwithstanding that a notice was served this week on the leasers, by a representative of the Townsite company, to the effect that he claimed the ore and for the sampler not to ship it. A good strike has been made in the Red Cross tunnel which is being run to develop the Silver Kay group, consisting of four claims and situated in the southern part of Blue Ledge district, near the Glencoe. The tunnel is in 28 feet and a ledge five feet in width was recently encountered which carries gray and yellow carbonates that assay well in silver and lead. The group is owned by J. S. M. Jackson, Geo. Irwin, Wm. Shavelier and Ole Yorgenson, and the tunnel will be driven along the new-found ledge.

NEW MEXICO.

MINE SALE.—Lordsburg *Liberal*, Dec. 20: The payment was made to Salcido & Co. for the mine San Francisco of which mention has been made in the *Liberal* recently, and the amount, it is said by some, was only \$2000 or \$4000, and others say that \$20,000 was received from the Arizona Copper Co. on the 16th. The company is fortunate in obtaining the property as it has been a regular pay-producer from the grass roots. Ground was broken on it in December, 1887, and it yielded over \$50,000 to the owners who never used any modern appliances in the way of machinery in extracting the ore. The waste dump holds over 2000 tons of ore that will run over 9 1/2 per cent copper. It is safe to say that Salcido & Co. did not receive any more for the mine than the dump is worth at the present price of copper. Of course, as to the amount reported received is only common report, but the writer knows that if the Arizona Copper Co. had not closed the sale as soon as it did, a good round figure within range of its value would have been tendered. J. H. Hovey has bought an interest in the Black Dyke mine, and has a force of men working night and day. It is also reported that he is going to put a 10-stamp mill on it.

MECHANICAL PROGRESS.

Steel in Locomotive Boilers.

Steel boilers for locomotives are not generally used in France, and when recently the Paris, Lyons & Mediterranean road decided to use higher pressures for compounding, one of the first matters to consider was the material and construction of a boiler to withstand such pressures. It was decided to use steel because of its greater strength, but there were some doubts of its reliability. In the light of our experience with steel boilers, these fears seem out of place; yet the steps taken to secure good steel show how carefully such matters are considered in France, and some American boiler-makers could profit by the methods there used.

The specifications for the steel required a minimum strength of 59,735 lbs. per square inch, and a minimum elongation of 26 per cent in pieces 7.87 inches in length. It is noticeable that no maximum strength was specified, as is customary in the United States.

In working the steel, great precautions were taken to prevent injury to the metal. Punches were not allowed; all holes were drilled. All flanges were turned with hydraulic pressure, and work was stopped on the steel sheets when they were lowered in temperature to a dark red color. After flanging and after being fitted and drilled ready for use, and even when rolled into form, the sheets were placed in a large annealing furnace, about 1200 cubic feet in capacity, constructed especially for the purpose, in which they were annealed, and after that the use on them of a hammer for any purpose is carefully avoided. The holes were first drilled about 0.08 inches in diameter, less than the diameter of the rivets, and after being put in place they were reamed to size. In annealing the sheets they were raised to a cherry red, and were kept at that temperature by a slow fire from 15 to 18 hours. At this time the cover of the furnace was slightly raised, the fire pulled out, and the temperature of the furnace and the sheets allowed to become reduced during the next 48 hours. The sheets were then removed from the furnace, and 12 hours after were put into position. Iron rivets were used, and driven preferably by hydraulic riveters.

The case of careful manipulation of steel sheets, with other instances of the kind which the traveling engineers saw this summer, go to show that the French, German and English engineer has not that high confidence in sheets of that material which is possessed by the engineer in the United States. If it were not for the large number of steel boilers in use here, which run practically without cracking or rupture of any sort, one might be somewhat concerned at the contrast between the scrupulous care taken by the foreign engineer and the more free and easy methods of boiler construction here. But the rarity of accidents to the vast number of steel locomotive boilers running in this country, often carelessly handled, is good evidence of the general reliability of our methods. It is true that we do punch steel boilers, but they seem to be none the worse for it. It is also true that the majority of all of the sheets in our boilers are unannealed, yet only a few of the vast number ever fail by cracking. It may be, however, that we have a better class of steel sheets to deal with, and that the large demand for steel of a low tensile strength and a maximum elongation has fostered the growth of and improvement of processes whereby we are able to obtain steel for the construction of boilers which has a uniformity in general characteristics that is almost unknown among boiler-makers abroad.

Nevertheless, in spite of the good quality of steel which we are fortunate enough to possess, and the good fortune which seems to attend the construction of steel boilers—and their use as well—would it not be well to pay a little more attention to the matter of annealing steel sheets after they have been worked upon, particularly after they are flanged? Attempts are now being made to do this, and nearly all the modern locomotive specifications call for "all sheets to be annealed after flanging," but this is almost never done in the full sense of the term "annealed," or anything like it. It is no easy matter to anneal a steel sheet, and the mere heating over a wood fire for a short time, as the practice is in some localities here, not only does not properly anneal a sheet, but sometimes it is hardened by the sudden cooling allowed. There are many steel boilers now in use which are constructed of plates that have been flanged, but which are too large to enter any annealing furnace used for locomotive boiler work in this country. In some shops, however, steps are being taken to meet the demands of the regular specifications for locomotive boilers, notably at the Rhode Island Locomotive Works, where one of the largest annealing furnaces in the United States has been recently constructed, and is now in successful operation.—*Railroad Gazette*.

SOME PECULIARITIES OF IRON.—Scientists are constantly developing new and interesting peculiarities of iron, many of which are being turned to useful account by practical mechanics. One of the latest developments in this direction is found in some French experiments, which show that if a bar of hard iron be allowed to cool from a white heat to a dull redness there is a spontaneous disengagement of heat, and its magnetic properties suddenly

change. In order to ascertain whether this result might be due to the heat set free by the modification of the iron, or if it required the presence of iron, iron was operated with containing from 0.16 to 1.25 per cent of carbon, by which means the first phenomenon above mentioned was found to be due to the molecular transformation of the iron, and the second corresponded to a change in the relation of the iron with its carbon. It takes place at 749° C., when the thermometer suddenly stops and rises some 6°, afterward resuming its regular fall, as the metal cools. This was observed with steel containing 0.57 per cent of carbon, while with only 0.16 per cent of carbon a much slighter effect of the kind was noticed at about 749°; with 1.25 per cent of carbon, the two effects appear to confound themselves. When the proportion of carbon is increased, the temperature of the transformation of the iron seems to be lowered, and that of recalcence raised, so that both come to coincide in the hard steel.—*Chicago Journal of Com.*

Shapers and Shaping Machinery.

The position of the engineer and machinist of to-day, as compared with that of his predecessor of only a few decades back, may fairly be considered as an enviable one. At that period machines which could make machines, or parts thereof, were almost or quite non est. Nasmyth's steam hammer did not exist, and the production of large masses of forged iron was an extremely laborious and often risky affair. And for preparing parts for the fitting shop, almost the only mechanical apparatus driven by power was the lathe, with the slide-rest scarcely perfected.

The planing machine, even in its most rudimentary state, as yet was not, and the only method of producing a perfectly plane surface on metal was by chipping with the chisel, and afterward scraping or grinding, a toilsome and unsatisfactory process. For pieces of irregular or peculiar shape there was no forming apparatus save the common file impelled by the arms of the worker, and the boring bar was equally a thing of the future.

The invention of the planing machine was a great step. Henceforth the engineer or machinist had a ready and certain method of securing perfectly plane surfaces by the aid of power.

The planer naturally and of course gave birth to the shaper, which is, at least, equally useful with its parent, and of very wide applicability.

The shaper is now found in every machine-shop, is made in many forms by different manufacturers, and of various sizes, from small examples to be operated by hand to the larger species of power-driven machines.

The difference between a planer and a shaper consists essentially in the length operated upon by the cutting-tool in one stroke.

"The stroke of a shaper is usually limited to a few inches, since the work is fixed, and the tool travels, and the rigidity of the tool is dependent upon the length of the arm that carries it. But in a planing machine the tool is fixed on the cross slide, while the table travels, and the rigidity of the latter, and that of its bed, will allow of a stroke of as much as 40 feet being taken. Hence planing machines are proper for long faces, but shapers are quicker in action for small work."

So was the distinction between the two classes of tools tersely put some time since by a writer in the *English Mechanic*.

In many of the shapers the tool-boxes have motion in one direction only, but in the better class of machines both vertical and horizontal movement is secured.

Indeed, in some shapers of elaborate construction intended for use in large shops, the tool-plate is rendered capable of circular motion, also for the shaping of convex or concave surfaces, the varying degrees of curvature required being obtained by very ingenious contrivances.

These machines are susceptible of being actuated at different rates of speed, according to the work on them. For brass, for example, the speed at which they are driven is faster than for iron.—*London Builders' Reporter*.

ANNEALING AND HARDENING.—Copper, brass, German silver and similar metals are hardened by hammering, rolling or wire drawing, and are softened by being heated red hot and plunged in cold water. Copper, by being alloyed with tin, may be made so hard that cutting instruments may be made from it. This is the old process of hardening copper, which is so often claimed to be one of the lost arts, and which would be very useful if we did not have in steel a material which is far less costly and far better fitted for the making of edge tools.

THE MOST POWERFUL ROLLING MILL engines in the world, according to the *English Mechanic*, are the reversing engines just made by Galloways, of Manchester, for Palmer's Ship-Building Co. The engines drive a 44-inch train of rolls. The cylinders are 56 inches diameter and 6-foot stroke, and use steam at a pressure of 100 pounds. The finishing shaft has journals 21 inches diameter, and is of a total length of 23 feet 6 inches. The total weight of the engines is nearly 300 tons.

ADDED TERRITORY.—By the re-survey of the boundary-line between Nevada and California, the latter gains a strip over 200 miles long and three-quarters of a mile wide.

SCIENTIFIC PROGRESS.

Fossil Remains in Oregon.

The John Day region in Oregon was the scene in the Princeton University scientific expedition last summer, and as a result a grand collection of fossils was obtained.

From the Blue mountains westward to the Cascades the country is a great volcanic plateau, made up of lava sheets piled one upon another and indicating ancient volcanic outbursts upon a stupendous scale, in comparison with which such vents as *Ætna* and *Vesuvius* are the merest pygmies. Through this mass of lava the streams, aided by the atmosphere, have cut deep valleys, some of them broad and open, others deep, gloomy canyons.

This country is very dry, but the soil is excellent, and where irrigated it produces well, the vegetables and fruit being of particularly fine quality. Great acres that are now arid sagebrush deserts will one day be turned into fertile farms by means of artesian wells, and the mild climate will insure success. At present the great industry is wool-raising. The enormous bands of sheep utterly destroy the grass of the country over which they range, till it looks as if a plague of locusts had visited it.

The scientific attraction in the John Day region is the vast assemblage of fossil animals which is entombed in the rocks there. This entire district was in a former geological age the bed of a great fresh-water lake, into which the streams brought masses of sand and mud and volcanoes showered cinders and ashes. Animals which were swept into the lake in the times of flood became covered with silt, and as the latter was in the course of ages consolidated into rock, the bones of the victims were gradually petrified and thus indefinitely preserved. Now the rock is slowly disintegrated by the action of the rain, snow and frost, and the bones exposed to view or even washed entirely out. For the most part, however, the specimens must be cut out with pick, hammer and chisel, a very laborious process, as the rock is often extremely hard and the blazing summer sun makes the face of a white cliff anything but an ideally comfortable place.

Could we produce a view of that ancient Oregon when the John Day lake existed, we should find ourselves in a very strange animal world; little three-toed horses hardly larger than donkeys, rhinoceroses, camels, peccaries—a great assemblage of large and fierce cat-like, dog-like and hyena-like animals—not to mention hosts of little rabbit and squirrel like creatures. The animals of this time were all rather small, the largest being the entelodon, a beast not unlike the hippopotamus in size and general appearance. As the list shows, this assemblage has a very Oriental character, and this wonderful museum of a buried world has been sealed up by subsequent lava floods, and is now accessible only on the aides of deep canyons cut through the overlying masses of volcanic detritus.—*Scientific American*.

Book-Making in Japan.

We recently described in these columns the peculiar manner in which a Japanese artist works to produce paintings and drawings. We now give the equally curious manner in which those peculiar people write, or rather paint, their books. We copy from the *American Bookmaker*: Having resolved to "paint" a book—for, as all the world knows, the Japanese use a brush, and not a pen—the author betakes him to his workroom. It is a little room, a very little room. "Six mats" is its Japanese measurement, and a mat is about six feet by four. It is full of soft, dull light which pulses from a square white paper lantern; the low, bright wooden ceiling gives back a pale brown gleam here and there. There is a silvery glint in the frail paneled walls, and in a warm gray shadowed recess a gold Buddha crosses his feet and stretches forth his palms, smiling gently upon the lotus which he holds. In another recess stand the ornate vessels of iron and clay and bamboo for the tea ceremony.

The author sits on the floor in a flowing garment of brown silk lined with blue, his legs disposed comfortably under him. In front of him stands a lacquered table about a foot, and upon it his writing materials, which are as idyllic as his surroundings—his paper is delicately tinted yellow, with blue lines running up and down. His inkstand is a carved ebony slab, with one end hollowed out for water to rub his ome of india ink in, and holds the four or five daintily decorated bamboo brushes which are his pens. Naturally he does not write his novel; he paints it. Beginning at the end of the whole, at the left of every page and at the top of every line, straight down between the two blue parallels his small brown hand goes, with quick, delicate, dark touches. Although this novelist's "copy" might seem to a stranger to be daintiness itself, yet he always has it duplicated "by an artist" before sending it to the publishers, the success of the book depending so largely upon its artistic forth-bringing. The "artist" to whom the "copy" is now intrusted proceeds to repaint the long series of word-pictures with a professional dexterity which is something astonishing.

The curious letter characters which have been, and not inaptly, compared to "cross boxes playing cricket," are thrown upon the paper with bewildering rapidity. To such an "artist," the straight up and down, rasping,

scratching, spattering movement of the Occidental pen must be something fearful.

The next step in the making of this book is to send the artistic reproduction of the author's "copy" to the wood engraver—a man of marvelous skill—whose duty it is to prepare the relief blocks, a task which he performs with extraordinary faithfulness to the original.

The printing is extremely simple. The ink is distributed with a brush, the paper laid upon the block, a feather, fashioned from a palm leaf, passed over it and the thing is done.

The binding is of the simplest kind. The Japanese public, unlike the book-lovers of the West, care little for that feature. A plain paper cover suffices, with the title in the left upper corner of the verso.

But the arrangements with the publishers are simply delicious. Said a Japanese author in answer to the inquiry of a European friend: "I pay the publisher myself; I do not mind losing by my own work, but I will not permit another person to make money by it." Think of it! Think of it, ye Murrys, Macmillans, Harpers and Appletons! Here's dignity of authorship for you. What a fruitless task a Western barbarian would have were he to attempt to explain to such childlike simplicity as this that the true dignity of authorship demands competition among publishers—immediate returns and freedom from the risk of fickle public taste.

A REPORTED ARCTIC DISCOVERY has been communicated by Captain George B. Leavitt, of the whaling ship *Spy*, of the Pacific Steam Whaling Company. He recently arrived from Alaska, where he has been for five years. He brings the first news, of what may possibly be the discovery of hitherto unknown land, many miles directly north of Alaska. During a cruise of one of the vessels of the whaling fleet, which ventured many miles farther north than any others, a few years ago, the officers discovered land that could not be found on any of the charts or accounted for in any way. A gale drove the vessel far north along the shore of the land, but the season was so late that the men did not stop to explore. The men held it was unknown land worthy of exploration at the proper season. No vessels since then have been so far north. Leavitt thinks this may settle the question of an open polar sea and ice drifts south of Point Barrow. He says the ice must find an outlet some other place.

WHERE AMERICAN ART IS APPRECIATED.—Some of the French artists at the Exposition range the foreign paintings as follows, with regard to their respective merits: The United States, Austria-Hungary, Holland, Belgium, England, Spain, Denmark, Italy. Politely may account for the poor representation of Italy, and perhaps the close imitation of French work performed with astonishing dexterity by our young artists in Paris may have something to do with the place of the United States at the top of the list. Spain had a fine show and disputed the first place with the United States, but Spanish art is mainly the work of a few men, whereas from America many hail. But throughout all the foreign section, with the exception of Great Britain and Holland, all that was good showed the influence of France. Holland has a distinctive style of its own and not a bad one.

AN EXPERIMENT SHOWING HOW PRIMARY COLORS PRODUCE WHITE.—Cut a circle of pasteboard nine inches across. Divide it into four parts; then divide each of these into seven. With bright, clear water-colors paint these narrow pie-shaped strips with red, orange, yellow, green, blue, violet, indigo, in this order; then begin, and do this in each quarter. Put a round, smooth nail or pin through the center of the disk where the points of the colors meet; drive this into a heavy board edge and whirl it around as fast as you can. The colors disappear, and you see a round but rather dirty white circle. If the colors were pure it would be pure white; if they were really prismatic you would have a little shining white moon of light.—*National Educator*.

AN IMPORTANT PHOTOGRAPHIC DISCOVERY is reported to have recently been made by Mrs. N. Gray Bartlett of Chicago, the wife of a prominent analytic chemist, by which photographs can be developed without the old-time process of washing in a dark room for hours and staining the fingers. By her process there is nothing to be done but to expose for a few minutes the negative, with the sheet of paper clapped on it for a few minutes, to the light. The pictures produced by Mrs. Bartlett's process are said to have the appearance of fine etchings. The development solution is smeared with ruby dye, which prevents white light from reaching the plate after being immersed in the liquid.

AN APPARATUS FOR PRODUCING ELECTRICITY. A very simple apparatus for obtaining an electric spark is made by a German physicist. Round the center of a common lamp chimney is pasted a strip of tin foil, and another strip pasted from one end of the chimney to within a quarter of an inch of this ring. Then a piece of silk is wrapped around a brush, and the interior of the chimney is rubbed briskly. In the dark, a bright electric spark may be seen to pass from one piece of tin foil to the other each time the brush is withdrawn from the chimney. Many other experiments can be tried with this apparatus.

ELECTRICITY.

The Future of Electricity.

Thomas A. Edison said, in an interview with a reporter of the *Pittsburg Dispatch*: "You ask me about the future of electricity. It is the coming motive-power. It will be used on all the railroads some day, but the point is to get an economical engine. My theory is to have immense dynamos located all along the line of the road, and have the electricity conveyed from these stationary engines to the locomotives by wires through the rails. For example, I would put two big engines between New York and Philadelphia, and enough power could be furnished to whisk the limited at the rate of 100 miles per hour."

"But this is the point I have been working on for years—to convert heat directly into electricity without the intervention of boilers, steam and all that. What an enormous amount of expense could be saved if this could be done! Think of putting something into the heat of that natural gas fire and making electricity out of it. It can be done. I feel it in my bones, and just now I have a suspicion that I am on the right track; but it is a pesky problem—one that can be worked out only in time."

"I have been experimenting with an electric road in New Jersey. I had rails laid as they put them down on railroads, but the machine would run off the track in going around the curves. I then raised the curve to an angle of 40 degrees, and the motor went around all right. It looked as if the engine would topple over, but it didn't. You know in a centrifugal machine you can make a car go clear around a circle in the air without leaving the track."

WHAT BRANCHES EMPLOY ELECTRIC WELDING.—At present, electric welding machines in different parts of the country are being used in the following capacities: Axle welding, carriage gears, fifth wheels, twisted wire cables, welding safe ends of boilers, wagon tires, hoops for barrels; it is also used for joining wires of copper, iron, steel and German silver together in like metals and different combinations; bars of metal may be joined at angles, as T or Y joints; welding eye rings to the end of bars; making rings of precious metals, uniting steel with iron in the manufacture of agricultural implements, tools, etc.; lengthening or shortening rods, bars, screws, or bolts; welding of cast-iron pieces in the general construction of machinery, such as frames, fittings, etc. Electric machines are also used in welding boiler plates and other sheet metal and thereby replaces the ordinary method of riveting. These machines are suitable for clamping devices, for electric soldering, brazing, forging or bending of metals. The electricians in the establishment of the Thomson Electric Welding Company of Boston are now experimenting on radiator and general brazing, on riveting machines which, it is claimed, will cause a complete revolution in the old methods of riveting, as by electricity the riveting can be done so as to avoid all leaking. One of the latest and most satisfactory developments has been that of welding chain. The company claims that a great merit to the electrically welded chain links is that when subjected to a fracturing load the link will break away from the weld, whereas when welded by ordinary processes it almost invariably breaks at the weld.

PROGRESS OF ELECTRIC WELDING.—The Thomson Electric Welding Company, at their Lynn works, have within a few weeks been able to weld wire cable 1 5-16 inches in diameter for a cable to be used on a cable railroad, showing greater efficiency than was thought possible in doing this very difficult work. Although the strength of joints obtained by splicing was about 30 per cent that of the original cable, yet it was found from tests made at the Watertown arsenal of electric welds made of this cable that 87 per cent of the efficiency of the rope itself had been obtained in these welds. The same company writes to the *Pittsburg Reduction Company* in regard to welding aluminum by electricity as follows: "We have made tests of the aluminum which you are producing, and find that it welds without the least difficulty. We have a special machine built for this work. The welds are very rapidly made and submit to the various tests and with most satisfactory results. We can weld the aluminum of any section or size. It simply depends upon the class of machine built for the purpose and the horse-power required."

AN ELECTRIC REGISTER.—New electric devices are being brought out almost every day, a feature characteristic of the electrical industry and its development. The latest invention, and one that has not yet been made public, is the "electrical register." It is intended to be used for a variety of purposes. A series of buttons along the inside of a horse car within easy reach for the conductor, connect with the register at the end of the car in somewhat the same manner as the present existing arrangement. By pressing one of these buttons the fare is registered and the announcing bell rings simultaneously. In the system used at present the conductor pulls the leather strap which rings the bell and the fare is registered by the return action of the belt. It is said that in the present method the gong can be rung without registering the fare by skillful manipulation. Again, in unloading a ship, switches can be so

arranged that each parcel of similar size, as in tea cargoes, registers as it closes the electrical connection. The same device can be applied in a pork-packing establishment, or in any place where it is necessary to record repeated action.

TEMPERING THE ELECTRIC LIGHT.—The electric light has now been long enough in use in our houses, theaters and public places to lose the right to claim any special privileges or immunities as a novelty or a plaything. Will some one kindly notice that there is nearly always too much of it? No sooner was gas laid on than people who had contentedly read their book by the light of a single flickering candle must have gas-jets equal to 15 or 20 candles. Now, if there is not a regular sunburst of 100-candle power, the same people feel that they are in the dark. It is too, too much. At one or two theaters, for instance, you can't enjoy the comfort you would otherwise derive from the diminished heat and improved ventilation, because of the glaring auditorium lights that strike you blind.—*New York Tribune*.

ELECTRICAL UTILIZATION OF WASTE HEAT.—A very interesting paper was recently read before the South Stafford Institute of Iron Steel Works Managers at Dudley, England, on "The Application of Electricity to Works and Mills." The reader stated that there was everything to recommend an electrical transmission plant. Waste heat from blast furnaces could be used miles away; steam boilers could be placed near the colliery to save hauling the coal; the power of a river or stream could be used and hundreds of horse-power conveyed along small copper wires, while the places could be lighted by electricity at a very low cost.

ELECTRICITY VS. OIL.—A report received at Washington from Guatemala states that since the introduction of electric lighting into the towns of that country, there has been a large diminution in the importation of mineral oils. In the capital of the Republic, with a population of 70,000, and in Quetzaltenango, with 30,000, the consumption of oil has fallen off one-half. At San Jose, Retalhulen and Antigua, the substitution of electric lights for oil illumination has been in a still larger proportion.

PAINT FOR INCANDESCENT LAMPS.—Electric incandescent lamps are sometimes used in the dark-rooms of photographers; and in order to render the light non-actinic, it is recommended that the bulbs should be painted over with a mixture of the red "fuchsin" in negative varnish. It may be remarked that the lower the current the redder the light from an incandescent lamp is, and hence the less need there is for the paint.

ELECTRICITY FOR EXPANDING HOOPS AND WHEEL TIRES.—An American electrician has devised a method of expanding hoops and wheel tires by heating them with the electric current. It is claimed for the new process that the heat is more uniformly distributed than with gas furnaces or piles of embers. The current is brought by wires connected to opposite points on the tire, and divides equally through each half of the ring.

ELECTRIC LIGHTING IN ENGLAND.—Lord Balfour of Burleigh, the Parliamentary Secretary of the British Board of Trade, states that the board has been overwhelmed this year with applications under the Electric Lighting Acts of 1882 to 1888 for provisional orders to sanction the production and supply of electric lighting in all parts of the United Kingdom. Already the number of applications has reached 430.

ENGRAVING BY ELECTRICITY.—Engraving on glass and crystal is now successfully accomplished. The glass is covered with a concentrated solution of nitrate of potash and put in connection with one of the poles of the battery, and the design is traced out with a fine platinum point connected with the other pole. By this process it is claimed that marvelously delicate work can be done.

CHEMICAL AND FRICTIONAL ELECTRICITY.—Some one asks what is the difference between electricity generated by chemical process and that generated by friction, magnets and otherwise? The answer given is that the difference consists in tension or potential; frictional electricity has very high tension compared with that generated by a battery.

THE STORAGE BATTERY heretofore to the windmill is sure to become of great service in driving the machinery of future generations. Before very long more attention will have to be given to the yoking of the winds, waves and tides to the driving shafts of our industrial works to supplement the storage-reservoirs of the coal mines.

MELTING IRON BY ELECTRICITY.—In a foundry near Moscow, so intense a heat is obtained by means of electricity that metals can be fused almost instantaneously. The glare, however, of the electric light produces such painful effects that the workmen refuse to work for more than two hours a day.

THE MAXIMUM POWER generated by an electric motor is usually considered 75-horse power; but experiments indicate that 100-horse power will be reached.

SOMEbody says that an electric wire is an ugly thing when anything serious crosses it.

GOOD HEALTH.

A Novel Cough Remedy.

The following is from a doctor connected with an institution with many children: "There is nothing more irritable to a cough than a cough. For some time I had been so fully assured of this that I determined, for one minute at least, to lessen the number of coughs heard in a certain ward in a hospital of the institution. By the promise of rewards and punishments, I succeeded in inducing them to simply hold their breath when tempted to cough, and in a little while I was myself surprised to see how some of the children entirely recovered from their disease. Constant coughing is precisely like scratching a wound on the outside of the body. So long as it is done the wound will not heal. Let a person when tempted to cough draw a long breath and hold it until it warms and soothes every air cell, and some benefit will soon be received from this process. The nitrogen which is thus refuted acts as an anodyne to the mucous membrane, allaying the desire to cough and giving the throat and lungs a chance to heal. At the same time a suitable medicine will aid Nature in her effort to recuperate."

ARE ASPHALT FUMES INJURIOUS TO HEALTH? In the Circuit Court at Buffalo, N. Y., a few weeks since, the trial was begun of an action brought by Michael Kavanaugh against the Barber Asphalt Company. The case is the result of the agitation on account of the odor arising from the asphalt works. Residents of the West Side have complained of it for a long time. Mr. Kavanaugh lives with his family at 347 Fourth street, and claims that the smell is injuring their health. He alleges, too, that it caused the death of his daughter. Dr. F. W. Bartlett was a witness, and his evidence was directed to show how the odor from the works might have led to consumption, the disease of which Mr. Kavanaugh's daughter died. Residents of the vicinity were called to the stand to testify concerning their experiences with the same odor. Richard H. Ferguson of 105 Maryland street swore that it had a suffocating effect on him. Mr. Kavanaugh demands \$10,000 damages.

THE EUROPEAN EPIDEMIC.—Telegraphic reports say that a frequent sequel to cases of influenza at Vienna is an attack of inflammation of the lungs. A number of persons in the hospital lately suffering from influenza have been stricken with inflammation of the lungs and several of them have died. The influenza has made its appearance in a Jesuit school at Kalesburg, the pupils of which are children of conservative aristocrats. Sixty-eight scholars have been attacked. At Brussels, according to dispatches of Dec. 24th, the epidemic is rapidly spreading. Thirty per cent of the school children were then suffering and the schools were all closed. The disease has spread to all the Government offices and many officials are prostrated. In Paris at the above date, influenza reigned supreme. There were said to be over 300,000 persons in that city alone suffering from the epidemic.

A POSSIBLE CAUSE OF SLEEPLESSNESS.—A physician, writing to the *Medical and Surgical Reporter*, says: "From some experience in my own family I am led to suspect that quite often sleeplessness may be due to a closely fitting night-dress. I observed in the case of my own child, that whenever the night-dress was buttoned tightly about the throat, she was sure to have an attack of night terrors; and that she never had them when the throat was left free and open. In certain positions of the head, the neatly fitting band would occasion constriction of the throat, whence arose mechanical congestion of the brain, which gave rise to the 'terrors.' A night dress closely fitting around the throat is a vicious thing, and gives rise to cerebral congestion, which may suddenly explode in a convulsion, but much oftener, I apprehend, take the form of night terrors."

EXCESSIVE HUMIDITY AND HEALTH.—It is consoling to Californians just at this time to learn from good medical authority that excessive humidity is not injurious to health. The human race, like the wheat plant, can stand almost any quantity of water. It is had for that class of maladies which physicians group under the head of rheumatism, but it is not necessarily injurious to delicate throats or lungs, and it is positively beneficial to persons who are liable to disturbances of the stomach. We believe that the death rate in this State has not apparently been increased by the excessive rains of the last few weeks.

DISEASE GERMS, according to *Medical Classics*, are very tenacious of vitality, and their destruction is not always easy of accomplishment. The researches of recent years show that many of the substances thus far relied upon as disinfectants have no power to destroy disease-causing bacteria.

A "HOOP SNAKE."—A scientist says that there is such a thing as a hoop-snake, but that it doesn't roll like a hoop. It simply makes a succession of loops, like the inch-worm, but so rapidly that it seems to roll around like a hoop.

USEFUL INFORMATION.

To Distinguish Amber.

Amber may be distinguished from its imitations by the following characteristics: Copal is yellow and always of a uniform color, while amber is generally shaded and striped or cloudy, and when rubbed with the palm of the hand, it evolves an aromatic odor, which is not the case with copal or artificial amber. Amber when coated with tallow, and held over the fire a few minutes, may be bent, while its substitutes remain rigid. It is crushed with difficulty, cannot be abraded or scratched with finger-nail; it can be cut, filed, sawed and polished, but it cannot be welded, like copal or artificial amber.

To Unite Broken Pieces of Amber.

Coat with linseed oil the surfaces that are to be united; hold the oiled parts carefully over a charcoal fire, a few hot cinders, or a gaslight, being careful to cover up all the rest of the object loosely with paper. When the oiled parts have begun to feel the heat so as to be sticky, press and clamp them together and keep them so until nearly cold. Only that part where the edges are to be united must be warmed, and even that with care lest the form or polish of the other parts should be disturbed; the part where the joint occurs generally requires to be repolished.

TO MAKE A WHETSTONE.—It is easy to make a stone for sharpening tools and to make it sufficiently hard, and give it the "bite" desired. Take gelatine of a very good quality, which melt in an equal quantity of water. The operation should be performed in darkness, as daylight is injurious to gelatine. When melted, add 1 1/2 per cent of bi-carbonate of potash previously dissolved. Then take about nine times, by weight, the quantity of gelatine employed of very fine emery and pulverized flintstone, which mix intimately with the dissolved gelatine. Mold the obtained paste according to the desired form, and press it in as hard as possible to consolidate the mass well. After it has been dried in the sun, you will have a first-class stone for sharpening.

OLD SILVER.—To imitate old artistic productions made of solid silver, the groundwork and hollow portions not subject to friction are covered with a blackish-red earthy coat, the parts in relief remain with a bright lead luster. Mix a paste of finely-powdered plumbago with essence of turpentine, to which a small portion of red ochre may be added to imitate the copper tinge of certain old silverware; smear this all over the articles. After drying, gently rub with a soft brush, and the reliefs are set off by cleaning with a rag dipped in spirits of wine. To give the old silver tinge to small articles, such as buttons and rings, throw them into the above paste, rub in a bag with a large quantity of dry hoxwood sawdust until the desired shade is obtained.

SLOW-DRYING GLUE is stronger than quick-drying, and for general use no method gives such good results as the following: Break the glue small and cover it with water in an iron kettle and let it soak twelve hours; after soaking, boil till done, then pour it into an air-tight box, and when cold, cover it tight. As it is required, cut out a portion and melt in the usual way, exposing no more of the made glue to the atmosphere than is necessary, as the atmosphere is injurious to made glue. Of course it should never be subjected to direct heat. It is better to use glue quite thin, working it into the wood, rather than too thick. Except in veneering, glue both surfaces, and never have the wood heated.

IN STAVE DRESSING, twelve co-laborers with a machine can dress 12,000 staves in the same time that the same number of workers by hand could dress 2500 staves. Nearly all the staves in this country are made in Indiana, Michigan, Northwestern Ohio and Canada. Indiana turns out about 75,000,000, Michigan 600,000,000, Canada 200,000,000, and Northwestern Ohio makes a big third of all the staves used in the United States. In Northwestern Ohio there are more staves made to-day than ever before. The business has been doubled within the last ten years.

HOW TO CLEAN PEARLS AND CORAL.—Set pearls which have become discolored by wear may often be improved by placing in a covered vessel with a mixture of whiting, ammonia and water, and permitting them to remain a few hours. Coral may be cleaned by soaking in soda and water for some hours. A lather of soap is then made and brushed upon the coral with the softest of hair brushes. A frequent changing of water is desirable.

CEMENT FOR AQUARIUM.—Each one pound of litharge, fine white sand, and plaster of Paris, as well as six ounces of finely pulverized rosin, are carefully ground into a paste with linseed oil varnish. The cement is good only after several hours, but is then excellent for either salt-water or sweet-water receptacles.

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Passing Events.

The persistent rains keep on, and although insuring a prosperous year to California, are, for the time, inconvenient, causing, as they do, washouts, local floods and cessation of most out-door work.

It is stated that the President has decided to send a special message to Congress, in which an unequivocal indorsement of the Windom plan of dealing with silver will be given. We published Secretary Windom's ideas on this subject at the time he made his report.

The Utica mine disaster is still the topic among miners. It does not appear that there is any possibility of getting at the bodies of the miners for months to come, on account of the great mass of rock and debris that cover them.

The snowfall of the present winter is ample to furnish an abundant supply of water for the mills and mines all over the country the coming season.

The bullion yield of Chollar ore crushed at the Nevada mill the current month will exceed \$30,000. Blanket-silver men in Six-mile canyon complain that the tailings from Chollar ore pulp are very thin, and contain a very small percentage of quicksilver, which indicates that the Chollar and Hale and Norcross ore is being worked to a much higher percentage of its assay value than last year.

Windom's Silver Policy Defended.

In a late telegraphic interview, Director Leach of the United States Mint throws more light upon Secretary Windom's silver policy and answers at length the charge of the MINING AND SCIENTIFIC PRESS and reiterated by Eastern journals, that too much power would be given the Secretary of the Treasury by allowing him to temporarily suspend the right of deposit of silver bullion, receiving treasury notes in return at the market value of the bullion, when he thought a corner was being run against the Government. As put by the Director of the Mint, the secretary appears justified in asking for such discretionary power after the price of silver bullion is forced above \$1 an ounce Government standard. To understand this to better advantage, it is necessary to state that the Government standard is 900, or nine-tenths fine; the English standard is 925, and ounce fine is 1000. All prices for silver bullion are based on its relative fineness to 1000 fine, so that in reality \$1 an ounce Government standard brings the bullion up to about par, so that the power asked for does not appear to be unreasonable, seeing that with other safeguards he can only use it when the price is advanced abnormally above \$1 an ounce standard.

While the PRESS is not fully committed to Secretary Windom's policy, yet we must admit that under the very general discussion which it has inspired, his views have found favor with the conservative classes at home, and are finding friends abroad even with leading mono-metallists who begin to see that bimetalism is one of the inevitables. So unmistakable are the signs that mono-metal papers are hedging and consequently carefully preparing the way for espousing bi-metallism. In witness of this assertion, we give the following from the London Money:

It was expected in many quarters that the message to Congress from the President of the United States would recommend a larger use of silver as money, and that even if an unlimited coinage were refused, the full limits under the Bland Act would be reached; that is, that \$4,000,000 would be coined every month instead of \$2,000,000. On the other hand, there is a party which would prefer to have no silver coined at all, except as tokens for petty transactions; in short, there are mono-metallists and bi-metallists in the United States as well as in Great Britain. There is also some such division as we see at home in the headquarters of each school. Here the bi-metallists are very strong in Lancashire, and comparatively weak in London. In the United States they are very powerful in the West, and less powerful in New York.

After reviewing at some length the President's message so far as it refers to silver, it gives expression to the following on Secretary Windom's silver policy:

Mr. Windom proposes to issue notes on the deposit of silver at the market value. The more discreet bi-metallists in this country also make an identical proposal. If notes of £1 and £2 were issued against silver at the market value, our currency would be increased by several millions and so much gold set free for external commerce. Every one knows that the gold now in circulation is insufficient for the increasing trade and growing population of this country, and in spite of all the fluster and bluster about gold mines in South Africa and elsewhere, we shall for many years continue to be short of gold. There are two alternatives before us: we may wait for a period of bad trade, in which there will be less demand for money, or we may make a limited and moderate use of silver by means of small notes for internal circulation. As to payments abroad, gold must go to whom gold is due, and silver to whom silver. But the use of ten millions in silver certificates would raise the value of the rupee and greatly assist trade. If President Harrison can see his way to adopt Mr. Windom's suggestion, it is very likely that Mr. Goschen will see his way to a similar policy in England.

THE Nevada mill is crushing about 4500 tons of Hale and Norcross ore monthly, and had it not been for the falling off of the assay value of the ore from \$30 to \$22 per ton—the average given in the last weekly report—the bullion yield for the current month would have reached nearly \$120,000. The average for the month will not fall far short of \$25 per ton, which, calculating that 85 per cent of the assay value is saved, will give a total bullion yield of \$100,000 for December.

MARTIN C. FISHER, a mining engineer well known in Colorado and California, died in London on the last day of the year. He was one of the organizers of the Richmond Consolidated Mining Company.

Prevention of Mine Accidents.

The fatal accident at the Utica mine, in Calaveras county, caused by an immense cave, has brought up a discussion on the proper methods of timbering in mines and the prevention of accidents. It does not appear, however, that there was any neglect in the timbering of this mine. On the contrary, a skilled timberman, selected for his special knowledge, and aided by a special set of men, had charge of this part of the work, and was given every facility to do his work properly. Timbers of very unusual size were employed, since it was known these were necessary in this mine. From all accounts, however, no system of timbering known to us could have withstood the pressure of the 50,000 or 60,000 tons of rock which caved.

In this country we have no Government or State officials to inspect mines and see that proper precautions against accident are taken. In Great Britain, since 1835, there has been a succession of Royal Commissions and of Parliamentary Committees collecting and weighing the results of experience and the views and opinions of miners, experts and mine managers. In 1850, Government mine inspectors were appointed to carry out certain important general rules for the conduct of mines.

Even with all the precautions adopted in that country it does not seem that in the matter of preventing falls of roofs or sides and caves in mines, they have been able to do much with reference to the inspection of mines for the purpose of ascertaining whether the roof or sides are safe. Mr. A. R. Sawyer, one of the inspectors, who is an authority, points out that the universal practice of tapping the coal or stone with some heavy tool and judging of its condition by the hollowness or deadness of the sound and by slight vibrations, felt on placing the hand against the surface while the tapping is being applied, although good, it is not to be relied on implicitly; especially in the case of rock roofs and long pieces. It has often been stated by witnesses at inquests on deaths from caves, that the roof had been sounded shortly before the accident, and considered perfectly safe. Many accidents would be avoided, if, in addition to the tapping test, the roof were carefully inspected for the purpose of detecting natural dislocations, such as faults or slips or defects developed by the working, and if the bearing, the inclination and the frequency of occurrence of slips were studied by mining officials, the timbering being regulated accordingly.

In mines such as the Utica, and many others that might be mentioned, there is no question that unremitting, careful and intelligent inspection, and the continued devotion of skilled labor to the liberal provision and maintenance of reliable supports, even when their necessity may seem open to question, constitute the best safeguards against accident. In this case there was provision of special labor and supervision for the application and maintenance of timbering in the mine generally. Every facility and encouragement was given for good work in the timbering. The unfortunate man in charge doubtless had faith in his work, for he himself was with the timber-gang when the cave occurred, and he lost his life with theirs. The whole ledge caved from top to bottom, evidently sliding down bodily. No one could have foreseen such an accident, though the mine is one which needed special timbering, and the heavy rains had added weight to the upper mass.

THE GUADALUPE QUICKSILVER MINE.—Commissioner Houghton of the Circuit Court has reported the sale of the property of the Guadalupe Quicksilver Mining Co., which was foreclosed to the Farmers' Loan & Trust Co. of New York City for failure to pay the interest due on coupons maturing on January 1, 1884. The loan was for \$500,000 in bonds issued by the trust company. The court issued a decree allowing the quicksilver company until October 1, 1889, in which to pay its indebtedness, and on its failure to do so, December 7th was fixed as the day of sale. The property was sold to Maria Coleman, the highest bidder, for \$378,700.

THE Sunflower mine, Pike City, Sierra Co., started up last Monday with about 20 men at work. Mr. T. E. G. Wolleb has gone up to the mine as assayer.

Mexican Silver-Lead Ores.

The exportation of silver-lead ores from Mexico to the United States practically began at Paso del Norte in 1884, upon the completion of the Mexican Central R. R. The ore trade rapidly assumed large proportions under the decision of the Treasury Department at Washington establishing a value standard rather than a quantity standard for the determination of the classification of ores.

The scarcity of lead-fluxing ores in the central and southwestern mining regions of the United States, and the rapid extension of the business of smelting ores of the precious metals, had caused a demand for fluxing ores out of all proportion to the supply in the United States.

There were found in Mexico very extensive deposits of lead carbonates, and not infrequently associated with a lime and iron gangue or matrix. These carbonates have a wide range in their silver and lead values, carrying from 15 to 50 per cent of lead and from 10 to 100 ounces of silver. In many cases high lead percentages are associated with low silver values.

The presence of lime and iron in quantitative excess makes these ores from Mexico very desirable, not so much for their silver and lead values as for the actual work such ores will perform in the smelting furnace. As an evidence of the wide distribution of these Mexican ores in the United States, they were shipped to Pueblo and Denver, Omaha, St. Louis, Kansas City and Newark, N. J., as well as to points in New Mexico and along the frontier, where large smelting plants have been erected to treat Mexican ores in connection with dry or non-lead ores from New Mexico and Arizona. No complete data are at hand showing annual value and tonnage of this ore trade, but from a calculation based upon the export ore tonnage entering the United States at Eagle Pass, Tex., the total annual shipments for fiscal year ending June 30, 1889, will approach \$1,500,000 in value.

The U. S. consul at Piedras Negras says the outcry in Mexico against the U. S. Treasury circular of July 17, 1889, comes principally from men engaged in the silver-lead ore trade who have suddenly lost their market and have large sums of money invested in Mexican mines; these men are principally Americans. The railroads are also heavy losers in ore freights, notably the Mexican International, the only railroad at present in Mexico said to be owned solely by American capital. The Mexican Government some years ago seriously considered the advisability of imposing an export duty on raw Mexican ores, so as to build up reduction works in Mexico, their only doubt being the question of fuel. With the development of the Sabonas coal-fields in the State of Coahuila, near the line of the Mexican International Railway, and the fair grade of coals made from the Sabonas coal, Mexico is now able to smelt her own ores. The American miners will be very glad to have her begin its operation and keep her raw ores at home.

A Nicaraguan House.

The canal projectors contend that Nicaragua is the greatest existing field for American enterprise. However that may be, we shall all hail with delight the commencement of practical work on that great engineering scheme. Since the virtual collapse of the Panama canal this Central American offers the only location possible for a ship canal between the Atlantic and Pacific oceans. The reason is two-fold. Firstly, the interruption of the great mountain chain, extending practically from Valparaiso to the Mexican frontier; secondly, that Nicaragua lies outside of the zone of calms, which would have rendered the Panama canal useless for sailing ships. The people of Nicaragua have a type of house—such as is shown in the engraving on our first page—much like that in which the Mexicans of California lived before the advent of the Americans. It is of adobe with tiled roof and an arched corridor or porch around it. Senator Stanford has adopted this general style for the buildings of the Leland Stanford University, thinking it best fitted for the climate. The buildings are of one story, with arched corridors, hnt stone takes the place of the Mexican adobe. Such structures are warm in winter and cool in summer. There are still numbers of such buildings standing in portions of California; a few of them being out toward the Mission in this city.

The Mining Belt of Peru.

The great mining region of Peru is a mountainous belt of country, running nearly the whole length of the republic, and comprising the two grand ranges of the Andes with the elevated table-lands between them. On the east of this belt are the extensive plains and fertile valleys of the Amazon and its tributaries. On the west is a narrow strip of coast 20 to 50 miles wide, for the most part a sandy desert, but producing abundant crops where irrigated, and here are found petroleum, salt, nitrate of soda in enormous amounts at the south, silver in a few localities, copper and other mineral products.

The Western Cordillera, running nearly parallel with the shore-line, rises like a wall on the eastern side of the coast belt, with passes from 15,000 to 18,000 feet high and peaks attaining 18,000 to 20,000 feet. Farther east, at a varying distance, is the Eastern Cordillera, composed of broken mountain ranges which, considered as one group, have a general parallelism with the western chain, but individually vary greatly in direction, sometimes running nearly east and west, in places projecting out into the Amazonian lands, or here and there curving around to unite with the western ridge, and with this inclosing immense inter-alpine plains. These general features are indicated in Fig. 1, which, with the description, we take from a paper on "The Topography and Geology of the Cerro de Pasco, Peru," read before the American Institute of Mining Engineers, by A. D. Hodges, Jr., formerly of this city, but now a resident of Boston.

The surface of the plains is uneven and traversed by lower ranges of hills which surround large lakes, or rolling pampas or fertile valleys, and through many of these last run rivers of considerable size. The whole country has a high altitude (averaging up to 15,000 or 16,000 feet), and slopes gradually north and east toward the Amazon, into which drain all the rivers. Its boundary mountain chains are scored on all sides by narrow, picturesque and precipitous ravines often thousands of feet deep.

In all parts of this region are deposits of val-

ment and of capital, this region has produced, according to Homholdt, an average annual yield of \$5,300,000 in gold and silver.

The Plateau of Junin.

In the Department of Junin is a large mountain plateau encircled by the high Cordilleras,

From its northern end issues the Upamayo or Chinchao river, which, commencing to flow northerly, soon bends completely around, receiving the waters of the San Juan and the Colorado rivers, and then flowing southerly behind the narrow range of hills bounding the

the hills which here meet the lake, and some 600 or 700 feet above its waters. Here are the salt-mine and works which supply the Cerro.

North of the lake is the Pampa of Bomhon, the easterly division of which is often called the Pampa of San Juan. At the north-east of the Pampa of San Juan is the old town of Pasco, now nearly deserted, but said to have been formerly (before the discovery of the mines of Cerro de Pasco) an active mining camp. Directly west of Pasco, across the Pampa of San Juan, are the hill and once famous vein and mines of Colquijirca, where evidently much work has been done in times past, but where only spasmodic efforts at mining have been made of late, the ores being sulphureted and unsuited for the patio process.

Still farther north are the hills around Cerro de Pasco, familiarly known as "The Cerro," and at the extreme north or north-east of the plateau the Huallaja river, rising from springs near the last-named town, breaks through the Cordillera and flows north-easterly to unite with the Amazon.

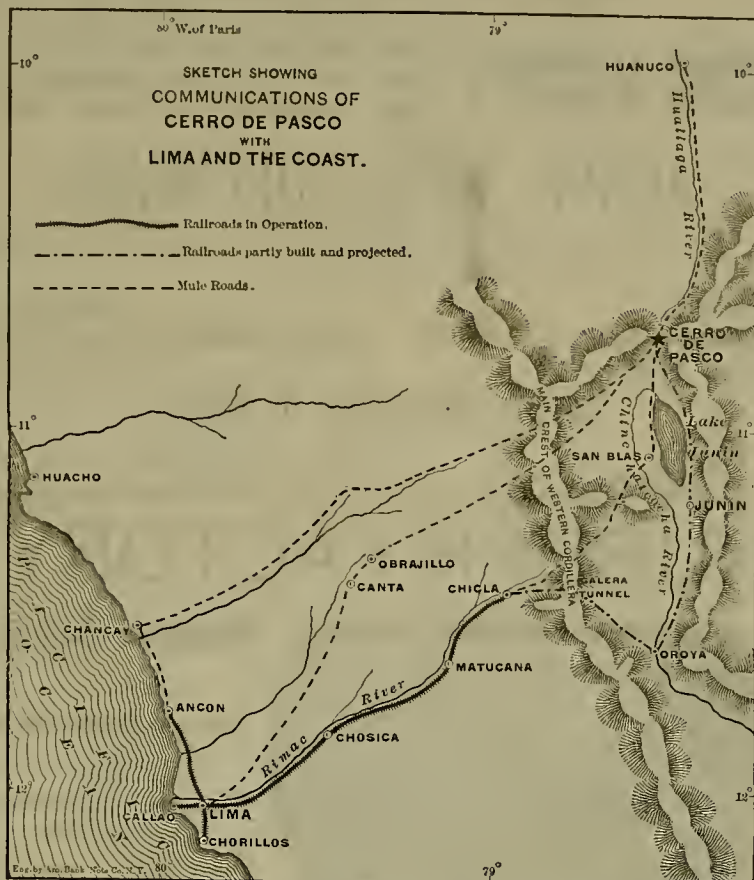
(To be continued.)

Snow-Shoeing in Sierra.

EDITORS PRESS:—In the high Sierras, where snow falls to such great depths that other means of travel are out of the question, snow-shoe riding has been carried to a science. When Snow-shoe Thompson, who gained such celebrity in carrying the mail through Alpine and Placer counties, came to Sierra to show them how to ride, he could hardly keep up with the schoolboys. Since his day great improvements have been made, both in the groove that now runs the length of the shoe on the under side and makes it practical to guide the things, and in the lubricating material called "dope" that makes the rider glide down the mountains with each lightning speed.

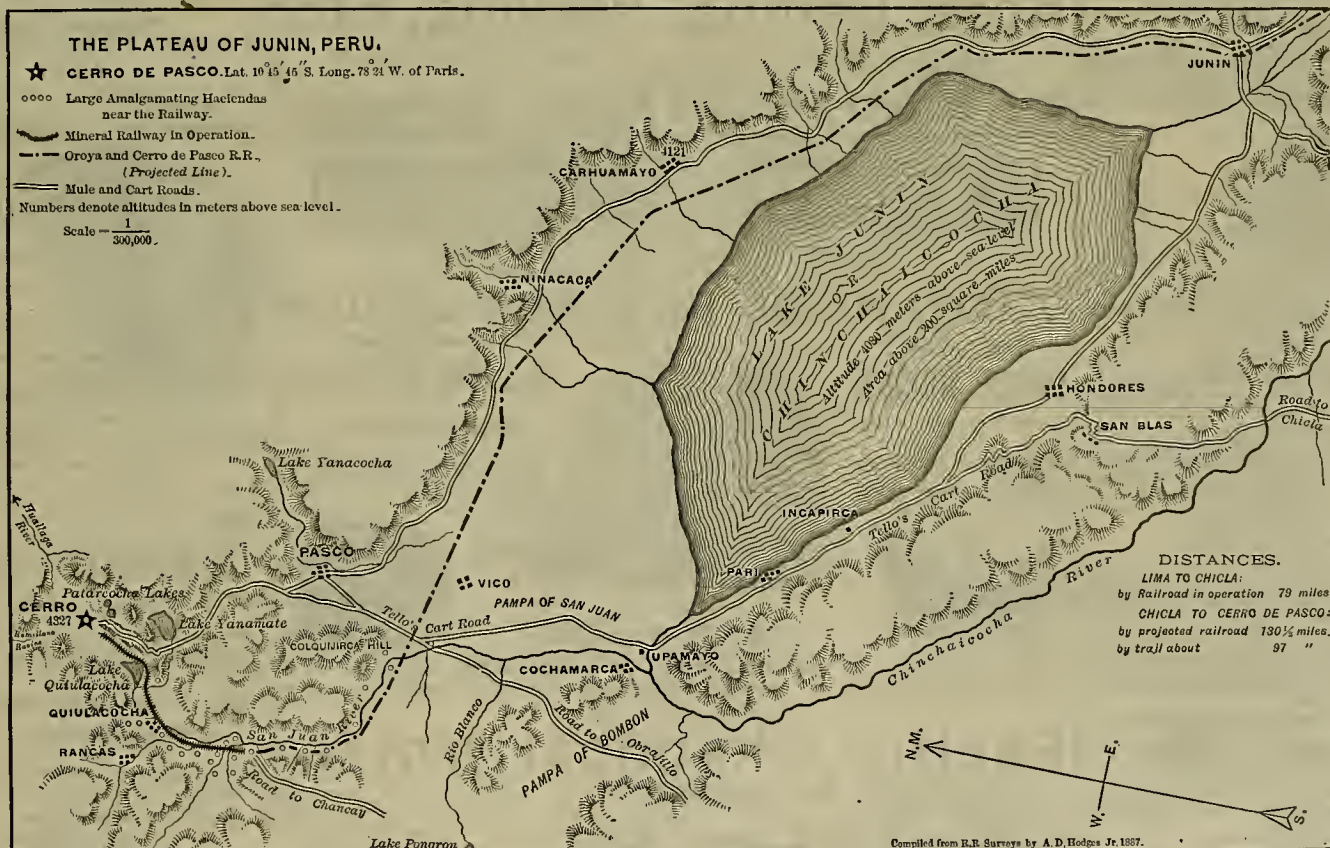
Snow-Shoe Clubs.

The Alturas Club was formed at Howland Flat, and rivals were soon formed at La Porte, Port Wine, Poker Flat and Gibsonville. After practicing for weeks these clubs would send champions to contest for prizes, which were very liberal in amount, and were made the occasion of much outside betting. Races would generally continue for a week and occasion



which here unite to form the Knot of Pasco (Nudo de Pasco). In this plateau, which extends north and south some two degrees of latitude, are the large lake of Junin, the pampa

lake on the west, unites with the Huancayo river near Oroya, and passes out through the southern depression of the plateau to join finally the Amazon.



able minerals. Gold and silver have been mined from the earliest periods; the quicksilver deposits of Huancavelica were once famed throughout the world, although now practically abandoned; lead and copper ores have been worked to some extent; salt and coal have been discovered at many points; and iron and other useful metals are said to exist. Notwithstanding all the drawbacks arising from want of roads, of proper methods and appliances of mining, of skilled labor, of capable manage-

ment of Bomhon, and the famous "Besin of the Cerro," where, in latitude 10° 45' 45" south and longitude 78° 24' west of Paris is situated Cerro de Pasco, the capital of the Department. Fig. 2 is a map of this plateau, compiled with care from accurate surveys.

Lake Junin (also called Lake Chinchicocha and Lake of the Kings), a body of water with an area of some 200 square miles and an altitude of 13,390 feet above the sea, covers the southern and principal part of this plateau.

In the lake are several varieties of fish, and duck and other game-birds frequent it in numbers. Along its level easterly shore is good pasturage, and the breeding of animals is carried on here to some extent. At its southern end is Junin, a small town famous as the place near which the Peruvians won a great victory over the Spanish forces in the War of Independence. There are a few villages near it. The most important locality in the vicinity is San Blas, situated about half way up its western shore in

more excitement than any horse-races. Sometimes thousands of dollars changed hands on the result of a contest.

The Snow-Shoe.

Basket-work shoes are discarded entirely, and for racing the shoe is made the width of the foot and ten to fourteen feet long, turned up at the ends, with a groove about one-half inch deep by one and one-half inches broad running along the whole length of the bottom. Experts prefer those made from fir of very straight grain. The thickness at the center where the foot is fastened is nearly one and a

fourth inches, tapering to five-eighths at the rear and a little thinner in front.

The Training.

After the snow has covered rocks and underbrush out of sight, and has settled down to solid business, the boys begin to get out the snow-shoes and practice under instruction. The shoes are polished as smooth as they can be made, and then the bottoms are smeared with some preparation to increase the speed. This mixture is looked upon as the main thing in the race, and Ex-Senator Wallace is now mainly famous for his wonderful "dope" that won so many races. The base of all these preparations is sperm-ceti, but almost everything kept in a drug store has been experimented with. Most of these contain beeswax, rosin, turpentine, and some essential oils. It seems that the mixture must be adapted to the condition of the snow, and, above all things, must be kept secret from rival clubs. A little lard tumbled upon the bottom of a rival's shoes, or a little salt sprinkled on his side of the track, will lose him the race, and if you want a good fight on your hands in a hurry, get caught trying to find how a rival mixes his "dope."

For weeks excited groups will be discussing the merits of different mixtures for cloudy and for sunny days, for hard snow and for soft snow and for different hours of the day. There seems to be no regularly established course. A few days before the race they choose the place where they can get the longest and steepest run free from obstructions and convenient for spectators. Distance varies from 2000 to 5000 feet.

Speed.

Talk about your racehorses or lightning trains. These men are reported by concurrent testimony of many spectators to have averaged as high a speed as 250 feet per second over a course nearly a mile long. This is more than four times the speed of a racehorse or twice that of a locomotive. Remember, too, that either of the latter goes over the course at uniform speed, while the snowshoe rider moves with a constantly accelerating motion, and we may say that his speed at the finish approximates twice the average, or 500 feet per second. No wonder that they report that they hold the breath from start to finish, and cannot remember having seen anything but a sort of bluish white light while running. They use a pole resembling a churn-dasher for helping themselves uphill and as a brake at the finish. It is not supposed to touch the snow until the goal is passed.

In Minnesota the Norwegians make "ski-racing," as they call it, a leading winter sport, and an expert from the old country sometimes makes a sensation, but one never heard of the groove there nor of the "dope." Sierra stands ahead.

F. S. C.

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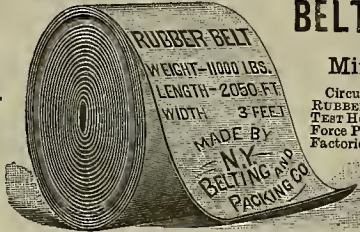
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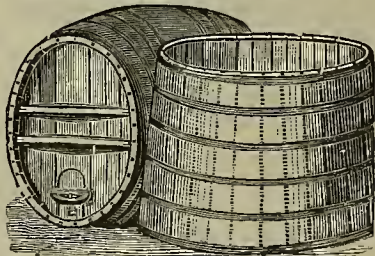
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List of U.S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

FOR WEEK ENDING DEC. 24, 1889.

417,850.—AXLE LUBRICATOR.—I. B. Abraham, S. F.
417,851.—VENTILATOR.—P. Abrahamson, S. F.
417,852.—TAG HOLDER.—Samuel Bauman, Santa Cruz, Cal.
417,855.—VINEYARD PLOW.—J. A. Bilz, Pleasanton, Cal.
417,856.—DELIVERY ATTACHMENT FOR CAN MACHINES.—Jos. Flick, S. F.
417,860.—BOOK REST.—W. C. Dow, Fresno, Cal.
417,861.—GATE.—A. W. Edwards, Shingle Springs, Cal.
417,865.—WATER WHEEL.—C. J. Green, Placerville, Cal.
417,866.—SCOURING, ETC., COMPOSITION.—Holloway & Frey, S. F.
418,936.—HARNES.—F. T. Livingston, Snohomish, Wash.
417,876.—MUSTACHE-HOLDER.—W. H. Masterman, S. F.
417,936.—HARVESTER.—J. & W. Paterson, Stockton, Cal.
417,882.—MINER'S CANDLESTICK.—G. Peterson, Tuscarora, Nev.
417,885.—FRUIT-PITTER.—Sanguinetti & Stevenson, Vallecito, Cal.
417,888.—PROPELLER.—R. Stevenson, S. F.
418,996.—TURNABLE MECHANISM.—Watriss & Heynemann, S. F.
417,961.—SPRAY PUMP.—A. W. White, San Jose, Cal.
417,894.—LEAK STOPPER FOR VESSELS.—W. Winchester, Mare Island, Cal.

The following brief list by telegraph, for Jan. 1, will appear more complete on receipt of mail addresses:

California.—Mark Anthony, San Francisco, station indicator; the same, street or station indicator; John W. Brown, San Francisco, section bridge; Joseph P. Deschamps and R. Mortimer Peters, sash lock; Calvin Ewing, San Francisco, collar-stuffing machine; Isaac S. Goldman, Los Angeles (assignor of part to H. Timkin and R. B. Leare, San Diego), organ motor; S. R. Hackley, San Francisco hydrant coupler; Andrew G. Norton, Arroyo Grande, windmill; Alonzo P. Fayson, San Francisco, setting speed and gauge for dredgers; John Ringen, Coronado, apparatus for utilizing euri-power; James H. Whitburn, Los Angeles, hydrocarbon burner.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

MUSTACHE-HOLDER.—W. H. Masterman, Alameda. No. 417,876. Dated Dec. 24, 1889. The object of this invention is to provide a simple, effective and readily applied guard, which will easily and accurately fit the face and pass over the mustache, holding a portion of it back firmly and compactly against the lip and cheeks, whereby it is kept out of the way in eating, and especially in partaking of liquid food, each as snip.

VINEYARD PLOW.—John A. Bilz, Pleasanton, Alameda Co. No. 417,855. Dated Dec. 24, 1889. This is a novel construction for plows which is specially adapted for cultivating the soil where there are rows of vines, shrubs or trees and where it is necessary to plow close to the roots or stems while maintaining the beam and handle of the plow at a considerable distance to one side in order to avoid the limbs and upper portion of the plant. It consists in the combination of a reversible plow, a beam to which said plow is connected and about which it may be turned, and handles and clevis made adjustable with relation to the beam, so as to stand at any desired angle thereto.

TAG-HOLDER.—Samuel Bauman, Santa Cruz. No. 417,852. Dated Dec. 24, 1889. The device is intended for marking goods in dry-goods stores, such as are known as piece-goods. The invention was described and illustrated in the PRESS of Dec. 21st last.

VENTILATOR.—Peter Abrahamson, S. F. No. 417,851. Dated Dec. 24, 1889. The invention relates to that class of ventilators in which a box having an opening on each side is employed. The object of the invention is to provide a simple and effective ventilator providing for the free and uninterrupted passage of the incoming and outgoing currents, thereby effecting perfect ventilation.

DELIVERY ATTACHMENT FOR CAN-MACHINES. Joseph Black, S. F. No. 417,856. Dated Dec. 24, 1889. This is a delivering device used in connection with can-machines by which the cans are taken from the machines proper and delivered at any given point. Though the invention is applicable to any can-machine, from which it is required to receive the cans in a horizontal or inclined position and to deliver them in an upright position, it is especially applicable as an attachment for a soldering machine, in which the cans are rolled in a suitable way or trough through a bath of molten solder therein. The invention consists in the novel combination of the guide or tracks and the traveling carrier. The object of turning the can on end is to enable the solder to set better while the can is in an upright position, than if it were continued in an inclined position, as it

will set more evenly around the flange on the end of the can, and as the cans are carried along on the belt the solder has time to cool.

GATE.—Arthur W. Edwards, Shingle Springs, El Dorado Co. No. 417,861. Dated Dec. 24, 1889. This is one of that class of gates in which the gate is mounted by means of suitable rollers upon a tilting track, whereby it opens and closes by gravity, according to the direction in which the track is inclined. The patent covers details of construction and certain combinations of devices.

MINER'S CANDLESTICK.—Gustavus Peterson, Tuscarora, Nevada. No. 417,882. Dated Dec. 24, 1889. The invention relates to that class of miner's candlesticks in which are combined a spear or piercing stick or bar, a hanging up hook, a socket for the candle, a fine-cutter and a cap-cripper. The patent covers the novel arrangement and construction of these several parts in a single candlestick.

FRUIT-CUTTING AND PITCHING MACHINE.—Luke Sanguinetti of Vallecito and W. T. Stevenson of Douglas Flat, Calaveras Co. No. 417,885. Dated Dec. 24, 1889. The invention consists in a novel knife for cutting the fruit and provided with teeth for engaging the pit or stone, a rotary feed-wheel provided with pins or points for engaging the fruit and carrying it down upon the curved knife, a hopper for directing the fruit to the wheel, a feed-hook for controlling the feed of the fruit and a vibrating screen for separating the pits from the cut fruit.

BOOK REST.—Wm. C. Dow, Fresno. No. 417,860. Dated Dec. 24, 1889. The invention consists in the novel extensible and contractible frame, the stops for the book-covers, the adjustable leaf-holder and line-marker, the adjustable supports and details of construction and arrangement. The object is to provide a simple book-rest adapted to be adjusted to different sizes of books and which is provided with a means for holding the leaves open and marking the lines in copying.

SCOURING, GRINDING, POLISHING AND SMUTTING COMPOSITION.—James C. Holloway and John Frey, S. F. No. 417,866. Dated Dec. 24, 1889. This is a new and useful composition of matter, the general object of which is to grind, and the particular object of which is for use in machines for smutting, scouring and polishing grain. The mixture is applied to the circumference of a light iron cylinder, until it is coated to a thickness of about one inch or 1½ inch. This cylinder is then placed in an oven and allowed to remain for about 12 hours under a high degree of heat. It is then taken out and while the coating is still hot and its pores are open, they pour over it some of the liquid extract of eucalyptus until the composition refuses to absorb any more, the cylinder being revolved during the application and until the extra coating or supply of extract is dry. This last application of extract of eucalyptus completely fills up the pores of the composition and renders the absorption of moisture impossible, and the solidity of the whole composition is increased. Silica is used in the composition to act as a cutting or grinding surface of a frictional nature, the other material serving as a bond for holding the particles of silica together, and being of a softer nature it wears away more rapidly, leaving the sharp edges and points of the silica particles projecting from the composition which, thus by friction, operate to effect the result desired.

COMBINED HARVESTER.—James and William Paterson, Stockton. No. 417,936. Dated Dec. 24, 1889. The patent on this traveling harvester and thrasher covers a main frame upon which the thrashing and cleaning mechanisms are supported, a single driving-wheel for communicating power to said mechanisms, a pole rigidly secured to the frame and extending in front, a swiveled-wheeled frame supporting the front end of the pole, means for the attachment of a team to said swiveled frame, and for the attachment of a second team between the machine frame and swiveled frame, a timber rigidly secured to the right side of the main frame, and extending at right angles thereto, a non-driving wheel at the outer extremity of said timber, a header-frame snepended from said timber so as to swivel thereon, and a means, comprising a hell-orank lever, chain and pawl and rack, for raising the front of the header frame.

WATER-WHEEL.—Chas. J. Green, Placerville. No. 417,865. Dated Dec. 24, 1889. This improvement in momentum or hurdy-gurdy wheels consists in buckets adjustably arranged upon the wheel-rim, and so placed with relation to each other that a certain proportion of water from the nozzle is discharged into the bucket nearest to the nozzle, while the remainder strikes the bucket just behind the first one; and also in a means for adjusting these buckets so as to change the proportion of water which is discharged into the first and second buckets. In this class of wheels the buckets are made of such a form that the water which is discharged from the nozzle under a high pressure is received into the buckets so as to pass around the concavity of the bottom and be discharged at the outer edges, thus being a common form of construction in several well-known wheels. In this invention Mr. Green improves the construction of the wheel by making these buckets transversely adjustable to

and from the center of the rim of the wheel and placing them with relation to each other, so that the stream of water is always divided between two buckets, one of which is behind the other.

CENTRIFUGAL AUXILIARY PROPELLER.—Robert Stevenson, S. F. No. 417,888. Dated Dec. 24, 1889. This is a device for assisting in the propulsion of vessels through the water. It consists of radial blades or wings, having the exterior edges either tapered or in straight or curved lines from front to rear, and secured to a shaft projecting from the bow of the vessel and beneath the surface of the water, so that when driven at a high rate of speed the centrifugal action of these blades will throw the water outwardly and produce a partial vacuum or open space in front of the bow of the vessel, into which it may be moved or forced with less expenditure of power than when the vessel is moved into water in its ordinary condition. This invention was illustrated and more fully described in the PRESS of last week.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, department 10, San Francisco:

GUATEMALA & CALIFORNIA CONS. CO., Dec. 27. Object, to receive concessions from the Government of Guatemala, buy and sell real estate in that Republic, import into and export goods therefrom and manufacture goods there. Capital stock, \$1,000,000. Directors—Mrs. M. R. Crosswell and Mrs. M. L. Crawford of Guatemala and John B. Turilli, R. B. Brower and John Lee of this city.

ALASKA COAL CO., Dec. 27. Capital stock, \$2,000,000. Directors—E. M. Patterson, B. E. Handy, W. H. Craig of Oakland, and L. B. Hatch and D. C. Gray of S. F.

NORTH AMERICAN COMMERCIAL CO., Dec. 31. Object, to hunt fur-bearing animals and sell the skins; also, to deal in lands and construct heats and other apparatus necessary for hunting and transportation purposes; also, to build all kinds of buildings for the purposes expressed; also, to purchase and sell all kinds of machinery, goods, wares and merchandise; also, to construct, purchase and operate trading-posts. Capital stock, \$2,000,000, in 20,000 shares. Directors—Lloyd Tevis, Henry Cowell, Albert Miller, Matthias Meyer and Isaac Liebes.

ECONOMY BUILDING AND LOAN ASSOCIATION, Dec. 31. Capital stock, \$1,000,000. Directors—Barry Baldwin, Moses Blum, James K. Wilson, William D. English, H. R. Willis, Geo. D. Toy, Bernard Faymonville, Isaac Anderson and Charles G. Clinch.

INSTALLMENT HOME ASSOCIATION, Dec. 31. Object, to deal in real estate and the construction of homes. Capital stock, \$5,000,000. Directors—Felix Marquis, A. S. de Gue, A. G. Southernland, M. B. Frost and Eugene F. Bert.

SAN FRANCISCO NOVELTY AND PLATING WORKS, Dec. 31. Object, to manufacture and deal in amalgamating plates and other articles for commercial use. Capital stock, \$30,000, in 300 shares. Directors—Andrew Rudge, Isaac N. Demorest, William E. Sheepman, Isidore M. Merle and Adrian J. Merle.

POPULAR RAILROAD GUIDE CO., Dec. 31. Object, to publish a railroad guide and hotel directory. Capital stock, \$25,000. Directors—J. Oliver Evans, Talliesin Evans, John L. Bromley, Fred L. Button and Arthur F. Price.

POSO CREEK LUMBER MILL, Dec. 31. Capital stock, \$100,000. Directors—Meyer Ehrman, Chas. Green, Samuel Sussman, John Alexander Campbell and Joseph Ehrman.

APOLLO CON. M. CO., Dec. 28. Capital stock, \$2,000,000. Directors—G. C. King, W. W. Gollin, R. Neuman, L. Sloss and G. Niebaum.

Meetings and Elections.

Annual meetings and elections have been held by the following mining companies:

PEER M. CO., Dec. 26: W. S. Lyle, president; C. H. Fish, vice-president, and J. B. Low, A. B. Clute and E. Gauthier, directors. Aug. Waterman was re-elected secretary, and William Pickett, Supt.

PEERLESS M. CO., Dec. 26: William S. Lyle, president; C. H. Fish, vice-president, and J. B. Low, A. B. Ruggles and E. Gauthier, directors; Aug. Waterman, secretary, and William Pickett, Supt.

WELDON M. CO., Dec. 26: William S. Lyle, president; C. H. Fish, vice-president, and J. B. Low, A. B. Ruggles and A. B. Clute, directors; Aug. Waterman, secretary, and William Pickett, Supt.

COMBINATION M. CO., Dec. 26: William S. Lyle, president; C. H. Fish, vice-president, and J. B. Low, A. B. Clute and A. B. Ruggles, directors; Aug. Waterman, secretary, and William Pickett, Supt.

THE Southern Pacific Co. paid taxes amounting to \$582,159 this week. The whole amount of taxes for the year 1889 charged upon the railroads assessed to the State Board of Equalization was \$668,024.45, of which \$292,328.06 was for State purposes and \$375,696.09 for counties through which the roads run. Of these taxes, \$667,778.37 has been paid, leaving \$245.78 delinquent, which is due from the Pullman Palace Car Company, the only company assessed by the State Board of Equalization which failed to make payment of its taxes.

THE CALIFORNIA WIRE-WORKS have discontinued the retailing-branch of their business and moved their main office to the factory, 332 Bay street, corner of Mason. The city office has been established at No. 9 Fremont street.

TELEGRAPHIC dispatches state that a very rich deposit of olivine ore has been found 30 miles from Tacoma, Washington.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Con. California and Virginia, Dec. 28, \$18,770; Justice, 28, \$5670; Hanauer, 24, \$4750; 25, \$5100; Young America South, 27, \$8600; Hanauer, 27, \$4800; Chollar, 31, \$13,736; Hanauer, 28, \$2350; Mt. Diablo, 28, \$10,831; Savage, 28, \$22,315; Alice, 27, \$23,848.

DELINQUENT SALE NOTICE.

Booth Gold Mining Company. Location of principal place of business, San Francisco, California. Location of Works, Auburn, Placer Co., Cal. NOTICE.—There is delinquent upon the following described Stock, on account of Assessment (No. 4), levied on the 23d day of November, 1889, the several amounts set opposite the names of the respective Shareholders, as follows:

NAME.	No. Certificates.	No. Shares.	Amt.
Richard Chenery, Trustee.....	110	6,275	\$125 50
Richard Chenery.....	17	5	10
Charles F. Eaton.....	171	300	6 00
Charles F. Eaton.....	172	300	6 00
Charles F. Eaton.....	173	60	1 20
R. N. Graves, Trustee.....	25	250	5 00
E. S. Harrison.....	177	1,000	20 00
Geo. R. Salency, Trustee.....	32	312	6 24
O. R. Spinney, Trustee.....	176	500	10 00
E. P. Slosson, Trustee.....	181	500	10 00

And in accordance with law, and an order of the Board of Directors, made on the 23d day of November, 1889, so many shares of each parcel of such Stock as may be necessary, will be sold at public Auction, at the salesroom of Middleton & Sharon, No. 22 Montgomery street, San Francisco, California, on MONDAY, THE TWENTY-ETH (20th) DAY OF JANUARY, 1890, at the hour of 3 o'clock P. M., of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of the sale.

OEO. R. SPINNEY, Secretary.

Office, 310 Pine St., Room 23, San Francisco, California.

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Books on Mining AND IRRIGATION.

PRACTICAL GOLD-MINING.—A comprehensive treatise on the origin and occurrence of gold-bearing gravels, rocks, and ores, and the methods by which the gold is extracted. By C. G. Warren Lock. 758 pages, with 8 plates and 271 engravings in the text. 4to, cloth, \$15.00, express prepaid.

IRRIGATION.—Egyptian Irrigation. By W. Willcocks, with introduction by Lt. Col. J. C. Ross. This work embodies the information collected during four and a half years of the irrigation systems of Egypt. Engineering questions, such as silt-deposits, drainage, irrigation, the Barrage, flood protection, methods of regulation, locks, etc., have been treated in detail. 367 pages, large 8vo, with 25 plates and numerous engravings in the text. Price \$15.00, express prepaid.

MEXICAN MINES.—Dahlgren's Historic Mines of Mexico. By C. G. Dahlgren. Price \$1.00.

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DIVIDEND NOTICE.

The German Savings and Loan Society.
526 California Street.

For the half-year ending Dec. 31, 1889, a dividend has been declared at the rate of five and forty-hundredths (5 40/100) per cent per annum on Term Deposits, and four and one-half (4 1/2) per cent per annum on Ordinary Deposits. Payable on and after Thursday, Jan. 3, 1890.

GEO. TOURNY, Secretary.

DIVIDEND NOTICE.

SAN FRANCISCO SAVINGS UNION, 532 California St., cor. Webb. BRANCH, 1700 Market St., cor. Folk. For the half-year ending with the 31st of December, 1889, a dividend has been declared at the rate of Five and Four-tenths (5 4/10) per cent per annum on term deposits and Four and One-Half (4 1/2) per cent per annum on ordinary deposits, free of taxes, payable on and after Thursday, the 2d of January, 1890. LOVELL WHITE, Cashier.

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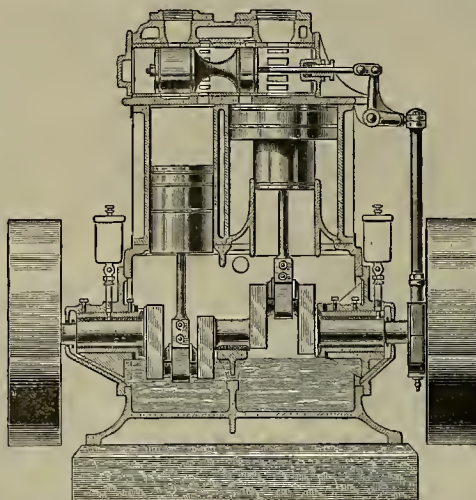
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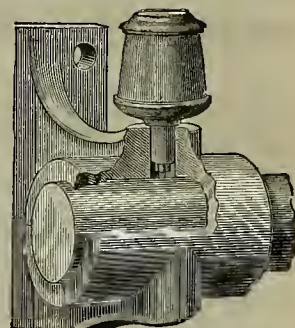
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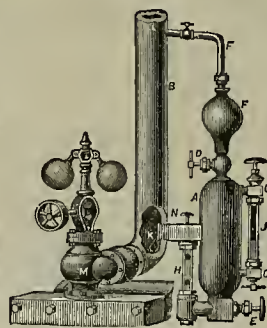
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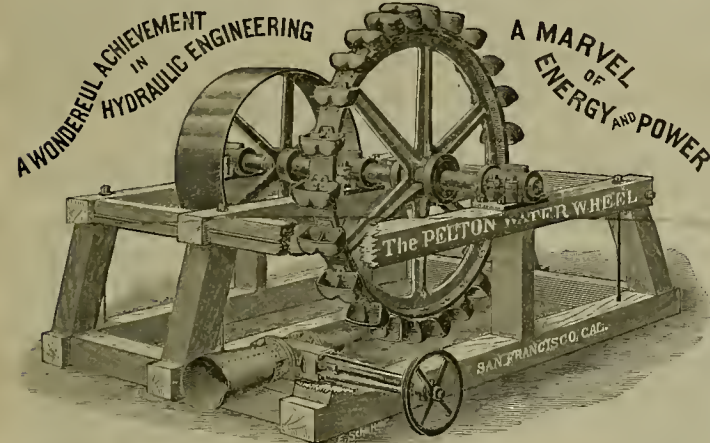
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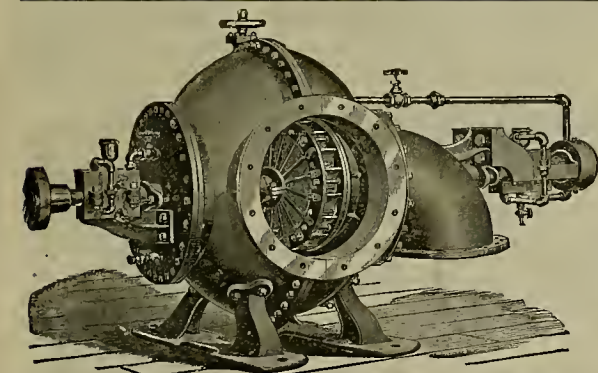
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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, Jan. 2, 1890.

The year 1889 closed on a close money market, and also on a dull market in all branches of trade. The close money market was due to heavy remittances to the East in October, November and the fore part of December, aggregating about \$10,000,000—real estate speculation—and toward the close of December to the paying of taxes and the calling in of money for the payment of dividends, interest, etc. The transfer last week to this city of about \$1,500,000 from New York had a beneficial effect. It is the prevailing impression that before the end of January the money market in this city and the State at large will be very easy under free disbursements on interest and dividends, and the payments by the State and different cities and counties from funds received from taxes.

The Eastern money market has been very close, with high rates of interest reported. Leading Eastern exchanges report that the outlook is favorable for an easy market after the turn of the year, as the general disbursements will be heavier than for years.

The local dividends for December compare as follows:

	1889.	1889.
Banks.	\$63,000	\$63,000
Gas and water companies.	\$128,350	\$128,350
Insurance companies.	8,000	14,500
Power companies.	27,000	27,000
Street railroad companies.	25,000	25,000
Sugar companies.	35,000	35,000
Mining companies.	25,250	25,250
Miscellaneous companies.	31,250	35,250
Totals.	\$502,850	\$572,750

MEXICAN DOLLARS—The market has ruled dull throughout the week at about 75¢/75½¢ cts. The stock here is reported to be large, considering the nature of the demand. If China, as reported by cable, decides to coin silver, as is being favorably considered, the demand for Mexican dollars will not be so large.

SILVER—The market has ruled dull and heavy throughout the week. The fall in sterling exchange has been against the market. The prospects are of a most flattering character, based on the following: The English Government will increase the currency of that country by the reinstatement of the two and a half sovereign and the coining of more silver; more coining by France, silver coining by China, and an increase in the silver coinage of the other countries which either use silver exclusively or in conjunction with gold. It is now a foregone conclusion that at the present session of Congress there will be favorable legislation on silver—either increasing the purchase for monthly coinage to \$4,000,000, with free coinage after the market price reaches par, or else a don't plan. This plan we gave in the Press on Dec. 14th, which is briefly as follows: To open the mints of the United States to the free deposit of silver, the market value of the same (not to exceed \$1 for 472.5 grains of standard silver) at the time of deposit to be paid in Treasury notes, said notes to be redeemable in the quantity of silver which could be purchased by the number of dollars expressed on the face of the notes at the time presented for payment, or in gold, at the option of the Government, and to be receivable for customs, taxes and all public dues; and when so received they may be reissued, and such notes, when held by any national banking association, shall be counted as part of its lawful reserve.

The United States silver standard is 900, which is one-tenth less than the commercial basis of 1000 fine. At \$1.40 ounce of 900 fineness (Government standard), the price would be over \$1.29 per ounce fine.

To-day (Thursday) silver is stronger and higher, being quoted here at 96 cents, with no sellers, and in London at 44½d.

QUICKSILVER—Receipts the past week aggregate 214 flasks. The market is quiet but steady.

BORAX—Receipts the past week aggregate 564 casks, and exports by sea 216 lbs. to Guaymas. The market is firm at full quotations.

LIME—Receipts the past week aggregate 2535 bbls., and exports by sea 400 bbls. to Honolulu, and 200 bbls. to Guaymas. The market is dull but steady.

LEAD—The market is reported steady, with the usual demand at this season of the year. The East reports a strong tone to the market.

TIN—The spot market for both pig and plate is unchanged, but for shipment the feeling appears to be stronger. The stock of pig abroad is quite light.

COPPER—The past week 47,000 lbs. copper matte was shipped to Liverpool. The market is very strong for all grades. Mail advices received from New York report heavy sales of Lake at 14½ to 14¾ cts. per lb. for delivery in the fore part of 1890. The consumption the world over is increasing, with France and Germany taking more freely than before. In France extensive works are being constructed to prepare sulphate of copper, using over 10,000 tons of copper to turn out 40,000 tons of sulphate of copper. As this goes into the ground for the destroying of phylloxera and other vine diseases, it sinks forever, not returning in the shape of old copper, etc.

IRON—Imports the past week aggregate 200 tons of pig from Liverpool. The local market is quiet but firm. Holders are firm in their views owing to the strong market abroad. A Philadelphia exchange says: "Ten years ago the United States was making about 3,000,000 tons of pig iron per annum; now we are making 8,500,000 tons, with prospects of a still larger production during 1890. Ten years ago, when prices began to advance, we were flooded with foreign iron, equal to nearly one-third of the domestic supply, while old rails, scrap, etc., came in almost endless quantities from all quarters of the globe, to say nothing of finished iron, steel rails, and other material. Now with a greatly reduced tariff, we are importing practically nothing, while at times our iron-masters have

seriously considered the possibility of their being able to export iron."

COAL—Imports the past week aggregate as follows: From Seattle, 7645 tons; Tacoma, 450; Nanaimo, 2200; Port Moody, 1450; Coos Bay, 450; New York, 101; Departure Bay, 650; Liverpool, 199; Cliffstone, 200; Black Diamond, 1000; total, 24,395 tons. The market for spot is rather quiet, but some holders look for more activity soon, but while expecting a better demand, they do not look for any better prices, owing to the free stocks here and readily obtainable coast supplies. The rainy weather is against the free consumption of steam coals. For cargoes of Australian on passage and for shipment the market is quiet and reliable quotations, or, at least, "bottom fact" quotations, are hard to get.

Eastern Metal Markets.

By Telegraph.

NEW YORK, Jan. 2, 1890.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday	94½	94½	14 25	3 90	\$21.00
Friday	94½	94½	14 25	3 87½	21.00
Saturday	94½	94½	14 25	3 87½	21.00
Monday	94½	94½	14 25	3 87½	21.00
Tuesday	94½	94½	14 25	3 87½	21.00
Wednesday	94½	94½	14 25	3 87½	21.00

NEW YORK, Dec. 31.—Quicksilver closed easier at 68c. Pig lead is sparingly used at \$3.90. The copper trade is moderate; no weakness in prices. No pressure of offerings. Lake, 14¼¢; Montana and Arizona, 13¼¢; Casting, 12¼¢; London cables, strong; £49 17s 6d Merchant bars spot; 749 15s future.

San Francisco Metal Market.

WHOLESALE. THURSDAY, January 2, 1890.

ANTIMONY	Refined, in casks	71¢	78¢
Powdered		71¢	
Concentrated		62¢	
All grades jobbing at an advance.			
COPPER			
Bolt.	21	@	22
Sheeting.	22	@	24
Ingot, jobbing.	17	@	18
do, wholesale.	15	@	16
Fire Box Sheets.	22	@	24
LEAD—Fig.	45	@	47
Bar.	5	@	6
Sheet.	6	@	7
Pipe.	1	@	2
Flue, discount 10% on 90 bags.	1 45	@	1 50
Buck, 3 bags.	1 65	@	1 70
Chilled, do.	1 85	@	1 90
STEEL—English, lb.	16	@	20
Cast iron, do.	9	@	9
Pick and Hammer.	8	@	10
Machinery.	4	@	5
Toe Calk.	4	@	5
TRIPLEX—B. V., steel grade, 14x20, P. S.	5	@	10
B. V., steel grade, 14x20, spot.	4	@	10
Obical, 14x20.	8	@	10
do, roofing, 14x20.	5	@	10
do, 20x23.	11	@	12
Pig, 30% sp. 30% sp. 30% sp.	23	@	25
CORE—Eng. ton, spot, in blk.	13	@	15
Do, do, to load.	16	@	18
QUICKSILVER—By the flask.	47	@	50
Flasks, new.	35	@	36
IRON—Bar, base.	3	@	34
Norway, base.	41	@	51
Spot.			
IRON—Glenarnock ton.	35	@	36
Epilston, ton.	35	@	36
American Soft, No. 1.	35	@	36
Oregon Pig, ton.	35	@	36
Puget Sound.	35	@	36
Olay Lane White.	27	@	28
Shot, No. 1.	35	@	36
Langron (base) primed 1 lb.	35	@	36
Bar iron (base) primed 1 lb.	35	@	36
Thorncliffe.	35	@	36
Garthscie.	35	@	36

Lumber.

Pine, Fir and Spruce.

	RETAIL.	JOBBER.
Rough Pine, merchantable, 40 ft.	\$20.00	\$17.00
41 to 50 ft.	21.00	18.00
51 to 60 ft.	22.00	19.00
61 to 70 ft.	23.00	20.00
1x3, fencing.	22.00	19.00
1x4.	21.00	18.00
1x3, 1x4 and 1x6, odd lengths.	19.00	16.00
Second quality.	17.00	15.00
Selected.	24.00	22.00
Clear, except for flooring.	31.00	29.00
Clear V. G. No. 1 flooring.	6.00	
Firewood.	14.00	10.00
Dressed Pine, flooring, No. 1, 1x6.	32.00	29.00
No. 1, 1x4.	34.00	30.00
No. 1, 1x4, 1x6, and odd sizes.	37.00	33.00
All sizes, No. 2.	27.00	24.00
Stepping, No. 1.	44.00	35.00
Stepping, No. 2.	25.00	20.00
Ship timber and plank, rough.	27.00	18.00
Selected, planed 1 side, 4x6 40 ft.	29.00	24.00
" " " " " " " "	31.00	26.00
" " " " " " " "	33.00	28.00
" " " " " " " "	35.00	30.00
Deck plank, rough, average 35 ft.	35.00	32.00
Dressed, average 35 feet.	40.00	35.00
Pickets, rough, B. M.	20.00	16.00
1x14, 4 ft long, B. M.	6.00	5.00

Coal.

	Per Ton.	Per Ton.
Australian	7 50 @ 7 75	Cardiff 9 50 @ 10 00
Liverpool S'm	8 50 @	Leigh Lump 16 00 @ 17 00
West Hartley	8 50 @ 9 00	Cumberland bk 16 00 @ 16 50
Scotch Splint	9 00 @ 9 00	Egg, hard 15 50 @ 16 00
SPOT FROM YARD.		
Wellington	9 00 @ Seattle	7 00
Scotch Splint	9 00 @ Coos Bay	6 00
Greta	9 00 @ Cannel	12 00
Westminster Brymbo	9 00 @ Egg, hard	18 00
Nanaimo	9 00 @ Cumberland, in sacks	19 00
Sydney	8 00 @ do, bulk	18 00
Gliman	7 00 @	

Complementary Samples.

Persons receiving this paper marked are requested to examine its contents, term of subscription, and give it their own patronage, and as far as practicable aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

MINING SHAREHOLDERS' DIRECTORY.

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ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.	
Adelaide Copper M Co	Nevada.	1.	Dec 31.	Jan 31.	Feb 23.	W H Graves.	426 Sansome St.	
Belle Isle M Co	Nevada.	13.	Dec 31.	Jan 31.	Feb 23.	J W Pew.	310 Pine St.	
Bullion M Co	Nevada.	35.	Dec 31.	Jan 31.	Feb 24.	R R Grayson.	327 Pine St.	
Bodie Con M Co	California.	11.	Dec 25.	Jan 11.	Feb 17.	E L Burling.	309 Montgomery St.	
Bouth G M Co	California.	4.	Dec 2.	Nov 23.	Dec 28.	Geo R Spincey.	310 Pine St.	
Camp Creek M & M Co.	California.	1.	Dec 5.	Nov 27.	Dec 27.	A S Folger.	213 Fremont St.	
Con Imperial M Co	California.	23.	Dec 5.	Nov 22.	Dec 27.	G L Medley.	329 Pine St.	
Con New York M Co	Nevada.	2.	Dec 15.	Jan 15.	Feb 5.	C E E Hott.	309 Montgomery St.	
Calaveras Blue Gravel Co.	California.	4.	Dec 3.	Nov 15.	Dec 23.	J A B Burris.	240 Montgomery St.	
Exchequer M Co	Nevada.	28.	Dec 25.	Jan 15.	Feb 21.	C E Elliott.	309 Montgomery St.	
Golden Giant M Co.	California.	15.	Dec 30.	Oct 16.	Nov 15.	J M Burling.	308 California St.	
Gray Eagle M Co	Nevada.	23.	Dec 3.	Nov 21.	Dec 24.	J A B Burris.	323 Pine St.	
Grand Prize M Co	Nevada.	23.	Dec 30.	Nov 21.	Dec 24.	J A B Burris.	323 Pine St.	
Kentuck M Co	Nevada.	20.	Dec 30.	Dec 11.	Jan 14.	Feb 4.	J W Pew.	310 Pine St.
Livermore Coal M Co.	California.	1.	Dec 50.	Dec 18.	Dec 15.	Jan 4.	G C Higgins.	420 Sutter St.
Mayflower Gravel M Co.	California.	45.	Dec 25.	Dec 23.	Jan 23.	Feb 23.	J M Burling.	329 Montgomery St.
Marathon M Co	Nevada.	29.	Dec 25.	Dec 21.	Jan 27.	Feb 18.	C E Elliott.	309 Montgomery St.
Mono G M Co	California.	29.	Dec 25.	Nov 18.	Dec 23.	Jan 24.	B L Burling.	309 Montgomery St.
North Occidental G & S M Co	Nevada.	1.	Dec 7.	Dec 2.	Jan 6.	Jan 27.	W H Watson.	302 Montgomery St.
National Water & M Co	California.	2.	Dec 5.	Dec 21.	Jan 23.	Feb 23.	F P Ames.	516 California St.
Vermin S M Co	Nevada.	61.	Dec 25.	Dec 21.	Feb 26.	Dec 23.	G D Edwards.	414 California St.
Palmdale M Co	Nevada.	2.	Dec 5.	Nov 1.	Dec 28.	Jan 30.	D Buck.	309 Montgomery St.
Platt & Gil on G M Co	California.	4.	Dec 3.	Nov 13.	Dec 20.	Jan 6.	O Hermann.	326 Kearny St.
Russell Reduction & M Co.	California.	5.	Dec 5.	Nov 11.	Dec 16.	Jan 8.	J F Morfizio.	328 Montgomery St.
Savage M Co	Nevada.	74.	Dec 59.	Dec 11.	Dec 11.	Dec 23.	E B Huntington.	309 Montgomery St.
Summit G M Co	Nevada.	1.	Dec 50.	Dec 14.	Dec 20.	Jan 14.	B L Burling.	309 Montgomery St.
Trinity River Tunnel & M Co	California.	2.	Dec 50.	Nov 27.	Jan 6.	Jan 28.	L H Pookman.	28 California St.
Teirakoff M Co	California.	3.	Dec 1.	Dec 14.	Jan 21.	Feb 14.	W J Garrett.	308 Pine St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Bald Mt Extension M Co.	California.	J W O'Neal.	Downville.	Annual.	Jan 23
Iowa M Co.	Nevada.	O B Higgins.	228 California.	Annual.	Jan 14
Platt & Gilson M Co.	California.	O Hermann.	326 Kearny St.	Annual.	Jan 14
Vermin S M Co.	Nevada.	L Parker.	309 Montgomery St.	Annual.	Jan 14
Rising Sun M Co.	California.	L Sloss, Jr.	310 Sansome St.	Annual.	Jan 7
Con St Gothard.	Nevada.	T Wetzell.	522 Montgomery St.	Annual.	Jan 14
Cuacuaran & California M Co.	California.	P Oliver.	22 Mint Ave.	Annual.	Jan 8
Bullion M Co.	Nevada.	R R Grayson.	327 Pine St.	Annual.	Jan 9

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Champion M Co.	Nevada.	T Wetzell.	328 Montgomery St.	90	Nov 25
Caledonia M Co.	Nevada.	S Chemin.	328 Montgomery St.	90	Aug 8
Con California & Va M Co.	Nevada.	A W Havens.	309 Montgomery St.	50	Dec 10
Derbec Blue Gravel M Co.	California.	T Wetzell.	522 Montgomery St.	70	Aug 25
Idaho M Co.	California.		Grass Valley.	5 00	Nov 7
Mt Diablo M Co.	Nevada.	L Parker.	310 Pine St.	25	Oct 25
Pacific Borax Salt & Soda Co.	California.	A H Clough.	330 Montgomery St.	1 00	Nov 10

Mining Share Market.

The mining share market the past week was fairly active, with lively and attractive fluctuations in the Comstocks, affording those able to secure the turns a good daily profit. The activity at the close of the year was not looked for, as the prevailing opinion has been and still is that we are to witness a lower range of prices, so as to force all the outsiders that it is possible into selling, after which have a deal. It is claimed that in this month the low prices will come. Experience has taught the more successful operators in buying to pay cash for the stock and not to hold for "big things" before selling, and also pay no attention to points. In outside stocks trading was light, notwithstanding well-circulated bull points, chiefly in the Tuscaroras. It is claimed by some of the better informed that another line of assessments is to be levied on the Quijoatas, Bodies and Tuscaroras, after which they will have a deal.

There can be no doubt but many of the mine managers are destroying the little confidence yet had in the mines by the persistency with which they grade the ore to lower assays and also by their not making public more details regarding the assays and the work going on in the mines. As a case in interest we give the following report of the average assay value of 2009 tons of Con. Virginia ore which is on file at the company's office in this city:

Gold.	\$1.00	Silver.	\$2.00	Total.	\$3.00
Per Car samples.	\$8,402	\$20,443	\$28,845		
" R. R.	9,106	20,287	29,393		
" Battery "	8,169	15,536	23,705		
Yield in bullion per ton:	Gold, \$9674; silver, \$12,335; total, \$22,010.				

The above report is dated at Virginia City, Nev., May 30, 1889, and signed, W. H. Lowell, clerk Con. Cal. and Virginia Mining Co. The report, as given above, affords stockholders a large degree of satisfaction, much more than are those now made, although W. H. Lowell still makes them out. By the reports now rendered stockholders are not allowed the privilege to see the car sample assays, nor are they allowed to know what percentage the mill returns to the mines. The report given above shows that the then contractor (Senator John P. Jones) returned 76 per cent of the assay of ores at the mines.

The reports of the Savage and Hale & Norcross mines do not return more than 70 per cent of the assays of ore at the mill, without saying anything about the loss in the assays of ore at the mines, which, if made public, would show a much larger shrinkage. Several of the other bullion-producing mines are managed in the same unsatisfactory manner.

The Hale and Norcross bullion product in 1889 was about \$600,000, no dividends; where did the bullion go? Savage's bullion product was about \$260,000, no dividends, but two assessments; Commonwealth's \$333,000, no dividend; Chollar's, about \$250,000, and \$112,000 paid in assessment, but no dividends. Several of the other mines show equally as bad. Con. Virginia's bullion product was about \$3,250,000 and dividends about \$1,020,000. Mt. Diablo's product was over \$400,000, and dividends about \$50,000. The total bullion yield of the mines listed on the two exchanges in this city was in 1889 about \$6,250,000, dividends about \$1,070,000, and assessments collected, about \$2,750,000. The above is not the best of showing for outside stockholders, for out of about \$9,000,000, only about \$1,070,000 were returned in dividends.

The market opened this (Thursday) morning dull and slightly lower. After the regular call the Comstocks strengthened, with an average advance of about 10 per cent recorded.

Reliable news from the Comstock mines continues hard to get. This is usually the case when stocks are being depressed so as to get them in as low as possible. Private information speaks, as heretofore, very encouragingly of the situation, and hopes are entertained of a new development soon. This development may be more in stock than in real game, so, if possible, to peddle out stocks. Official letters received from the Gold Hill mines were only received this morning from Challenge, Con. Imperial and Crown Point. The information about the work in the mines is about the same as given last week. Crown Point reports less ore sent to mill and the battery assays less. Letters from Hale and Norcross and Savage were not on file when the writer called. As private information from these mines

has been at variance with the official letter, the latter is not considered much. The work now going on in Union and Mexican, Ward shaft, Belcher, Seg. Belcher and Yellow Jacket deserves careful watching, as does that in Con. Virginia.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Dec. 11.	WEEK ENDING Dec. 18.	WEEK ENDING Dec. 25.	WEEK ENDING Jan. 2.				
Alpha.	1.05	1.15	.75	1.05	.80	.95	1.00	1.15
Alta.	1.15	1.70	1.10	1.30	1.25	1.30	1.31	1.55
Andes.	.45	.30	.40	.40	.45	.45	.60	.65
Belcher.	2.15	2.43	1.60	2.10	1.85	2.15	1.81	2.25
Best & Belcher.	2.70	2.49	2.25	2.65	2.55	2.50	3.00	2.85
Bodie.	.50	.50	.40	.45	.30	.4	.40	.85
Bodie Con.	.50	.50	.70	.65				
Benton.	4.00							
Bulwer.		.15					.25	
Commonwealth.	3.60	3.10	3.30	3.10	3.00		2.85	3.05
Concha, & Cal.	.45	4.65	4.40	4.10	4.70	4.40	4.70	4.40
Challenger.	1.35	.45	.45	1.10	1.25	1.10	1.10	1.10
Chollar.	1.55	2.50	2.05	2.6	2.15	2.46	2.35	2.71
Conquette.		3.00	.10	.10	.10	.10	.10	.10
Copied.	.15		.20	.10	.30	.35	.35	.35
Caledonia.	.15							
Crown Point.	1.65	2.15	1.35	1.70	1.50	1.90	1.60	2.10
Crocker.	.25		.25	.25		.25	.30	.30
Eureka Con.		.30	.30	.30				
Excelsior.	.40	.50	.35	.40	.35	.45	.45	.45
Grand Prize.	.40	.50	.35	.40	.35	.45	.45	.45
Gould & Curry.	1.50	1.61	1.31	1.50	1.30	1.50	1.35	1.85
Hale & Norcross.	2.70	2.90	2.30	3.00	2.30	2.55	2.50	2.85
Julia.	.30		.35	.30	.30	.30	.30	.35
Justus.	.60	1.10	1.25	1.45		1.25	1.40	1.45
Lady Wash.	.25	.30	.25	.30		.35	.35	.35
Mono.		.05	.15	.40	.45	.50		
Mexican.	2.60	2.48	2.20	2.65	2.60	2.35	2.60	2.35
Nevada.	.25	.30	.30	.30	.30	.30	.30	.30
Nevada Con.	.60	1.40	1.10	1.20	1.20	1.20	1.10	1.10
Nev. Queen.	.75	.63	.60	1.00	.85	1.01	1.00	1.00
Occidental.	.75	.95	.70	.50	.55	.70	.80	.80
Ophir.	3.85	3.90	3.00	3.60	3.05	3.60	3.30	3.90
Perran.	.80	.50	.70	.70	.70	.70	.80	.80
Poker.	1.70	2.00	1.70	2.35	1.90	2.00	2.00	2.00
Peerless.	.25	.20	.35	.30	.35	.35		
Perr.	.15	.10	.15	.15	.10	.15		
Sage.	1.30	1.85	.40	1.80	.40	1.55	.40	1.30
S. B. & M.	1.01	1.15	.90	1.05	.75	1.15	1.10	1.05
Star.	2.50	2.60	.75	2.15	.75	2.00	1.85	2.25
Silver Hill.	.35	.25	.30	.45		.45		
Scorpion.	.10	.10	.15	.15	.10			
Unloun Con.	2.55	2.90	2.10	2.55	2.10	2.40	2.15	2.60
Wash.	.65	.80	.50	.70	.60	.65	.70	.70
Yellow Jacket.	2.25	2.45	1.75	2.20	1.70	2.25	1.95	2.20

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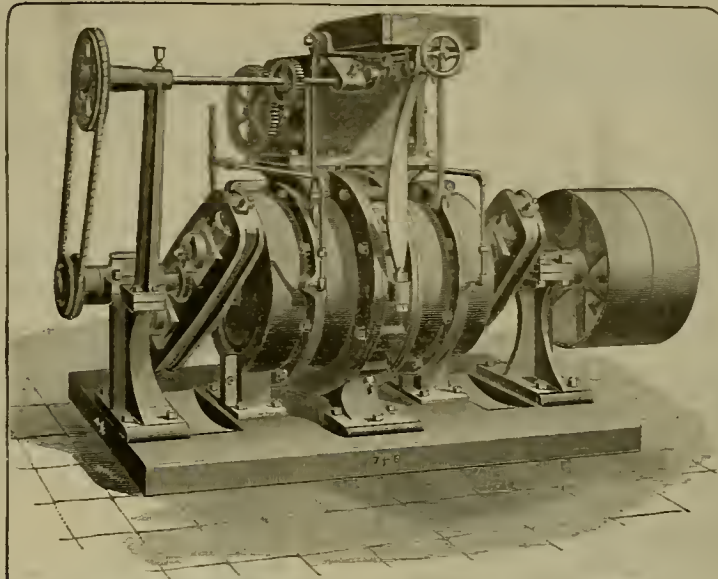


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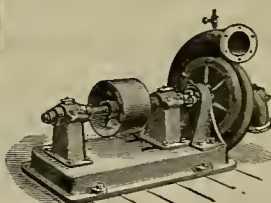
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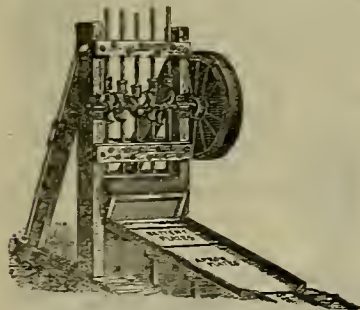
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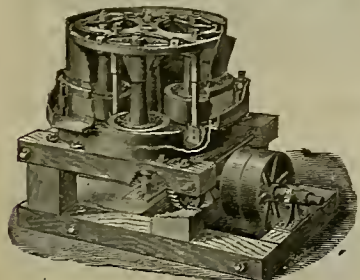
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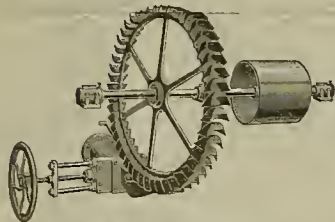
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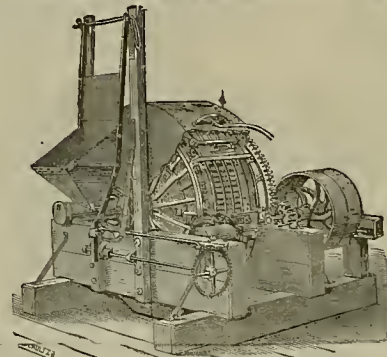
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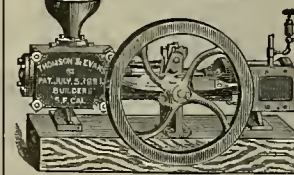
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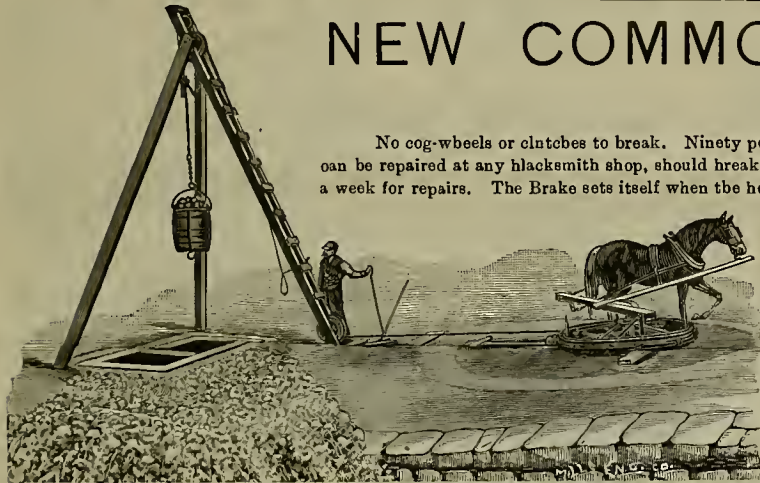
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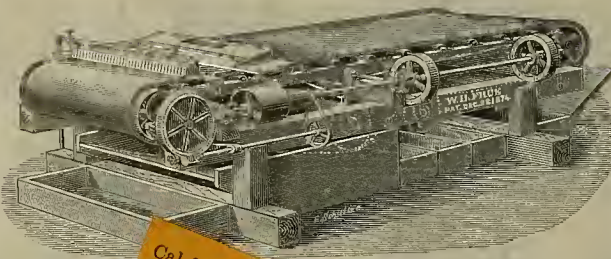
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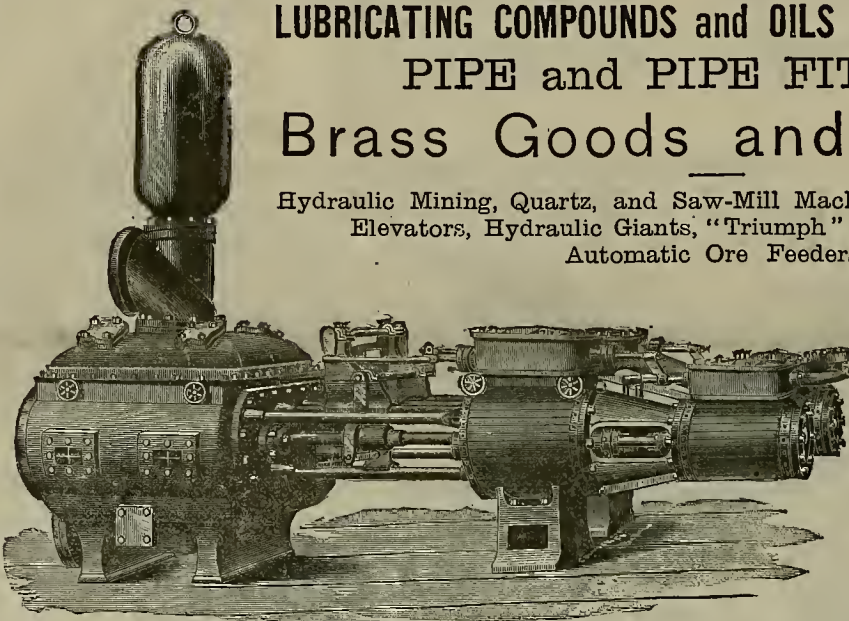
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The Chemical Laboratory Building.

An Addition to the University of California.

The Chemical Department of the University of California has suffered for lack of accommodations for some time, but a legislative appropriation of \$70,000 for a special building has remedied this, and ground has been broken and foundations laid for the structure. The new building, an engraving of which is shown on this page, is located south from the Mechanics' Art building, and it is expected will be completed this year.

Designs were drawn and plans made and the regents selected the design and plans as made by Mr. Clinton Day, the well-known architect of Berkeley. It is a radical and welcome departure from the commonplace forms of the structures already built, and will be a decided ornament to the University grounds.

The building will be of stone, brick and terra-cotta, and of the Victorian-Gothic style of architecture. It will be about 150 feet square, one story in front facing west, and two stories in height on the side facing south.

(Continued on page 29)

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We admit, unendorsed, opinions of correspondents.—EDS.

Californians in Austria and Germany.

EDITORS PRESS:—We left Venice Saturday, 10th, 9:15 A. M., without any regrets, and I would not put myself out much to make it the second visit. Here, and the first place that I have seen on this tour, "distance lends enchantment to the view."

The artists of Venice get up some beautiful pictures, tinted with all the colors of the rainbow and set off with an Italian sky. Perhaps it would not look well for me to say all I think about Venice. I do not know that I have any complaint of the people. Let others go and see for themselves. We retraced our steps as far as Verona, through level and well-cultivated fields. Here we go to the north up through a rough, rocky canyon, with very high, barren rocky mountains—only now and then a small piece of land worth tilling.

We Arrived at Borzen

About 6 P. M. and put up at the Hotel Kaiserkrone. It is a little city of 12,000, nestled between two or more high mountains. After gently disposing of one of the best dinners we have had since we left Paris (we are in the Riesling wine district, so I thought I had better prepare myself to pass on the imitations of some of my friends when I returned). We took a walk through some of the crooked streets and arcades, preparatory to pleasant dreams.

I presume I have stated heretofore that we are traveling on Gaze & Sons' R. R. and hotel coupon tickets. Our route from Paris around to London is traced on a map by a blue pencil, and tickets are printed with each place where we desire to stop, and coupon torn off as we proceed. We bought hotel tickets for 15 days each. One coupon for bed-chamber, one for dinner and one for tea. We usually do, and always should, tell as soon as we arrive at hotel that we have these tickets, and they assign rooms accordingly. We neglected to do so this time, and business being a little dull with them, they assigned us the best rooms in the house, which we felt very comfortable in. When we made it known that we had Gaze's tickets, they said these rooms did not go with those tickets. They showed us others, higher—not in price, but altitude. We declined, and stated as our coupons were getting short, we would pay them cash and retain the rooms. We requested them to make bills in francs, as we had that money, not Austrian. Everything was pleasant about the hotel except settling the bill—not on account of excessive charges, but currency. They made their bills in florins, and it seemed impossible for them to reduce the amount to francs, when French, Italians and Swiss are passing here every day and must have more or less intercourse with them. Finally they computed each florin equal to two francs, and we paid the bills and took our change in some paper and some silver.

In the squabble to pay our bills, the ladies disappeared. After looking for them for awhile, some one muttered enough English to say gone. He went below and found that they had run them and the luggage down to the train. All the Jehu knew was to wield the whip and reins, and the moment he got a load, away he put for the station. When we arrived, the ladies were peering out of the station with anxious looks.

We started for Munich, via Innsbruck, in a rain, which very much disappointed us, as we expected to see the high, lofty mountains on the trip. The clouds came so low down in the mountains that frequently we could not see more than half-way to their tops. We could see the troubled river Adige hundreds of feet below us, looking more like dirty milk than water. We went through tunnels, over bridges and along the side of precipices to our hearts' content. I do not think any one of them was quite equal to Cape Horn, but there were so many grand ones that it kept us looking and explaining all the time. We passed some wonderful terraced vine lands. It seems almost incredible that men will spend so much time and labor in making a steep hillside productive.

Incidents of Travel.

At Kufstern, on the border between Austria and Germany, all the baggage had to be taken out of the cars, carried into the station, examined and stamped. As we expected to return to the same car, we left our umbrellas, awl-knives, rubbers, etc. All passengers are driven into the station like so many sheep and looked in until all are examined and ready to load again. As soon as the door is opened all rush out pell-mell to secure seats. Each one of our party took one or more grip-sacks and started to find our car, not knowing the train had been removed and a new one substituted. As soon as we discovered the train had been removed, we found part of our baggage gone, and we set up a search for that. Passengers were all on board, bell and brass horn had sounded, the guards were shutting the doors; half of our party ran one way and part in another, and would come together in the center like two opposing armies, one asking the guard where is my cane? another where is my umbrella? another to the conductor with high-

keyed voice, where are my rubbers? etc., they not understanding a word we said, while the passengers were highly edified. Finally two of the ladies who are always looking for things that are not lost looked into the baggage-room, and Mrs. F. saw two of Aunt Ellen's rubbers, and she snatched up one of them, and looked around and saw a woman with my umbrella and cane and field-glass, and wrenched them from her hands and ran for the train. Meantime Mrs. H. trotted in and loaded herself with endries and ran also. The conductor appeared on the scene and he took up one rubber and a fan cast away by former passengers, and he also ran for the car. Now the trouble was to get a seat, as everybody was on board and the cars in the act of starting. A section was finally found with a Dutch woman and little daughter at the door and a man at the other end. She was determined not to give way and let us in, but we crowded in all the same, still good-naturedly but excited. The conductor came to the door and gave her a severe talking and she quieted down a little. Her face looked to me as though she had been employed by Bismarck as a hog-hater and the hated object had reflected back in her face. It seems to me an important place like that where they change cars, passengers should be informed of the fact by a person that can speak a language that all can understand. This has taught us that when we get out of a car to take all luggage or else leave some one on guard. The surest way is to travel as J. Ross Brown did—clothes on your back and toothpick and toothbrush in pocket. I expect this experience on the border will furnish material to relate to our grandchildren in years to come.

Munich.

The capital of Bavaria, is a much larger and finer city than I expected. They claim 250,000 population. I should think it a little high. There are a good many government buildings, art galleries, museums, public halls and gardens here. The streets are well paved, some are straight and wide, and some narrow and crooked. Soldiers are everywhere, with their fine-setting blue frock coats, dangling swords, gilt bands on cap, and straight as an arrow. Women are shoveling up mud in street, sweeping street, cleaning railroad track, running handcars, with dogs to assist them, and handling material on top of a three and four story building, while men drive hacks, drink beer and smoke. I actually saw a boy, man and woman running. I think the boy ran to get warm, as his sleeves were rolled up and he looked cold; I think probably the man was a Innatio and had lost his mind; I think the woman ran to participate in the gossip or scandal that appeared to be going on around the corner. I saw an ox hauling a brewery wagon with kegs of beer; the yoke was padded and fastened in front and below the horns. They use a pole to a good many of their wagons instead of shafts, for a single animal. Most of the shafts to the hacks are hung on one side of the center, so that the horse shafts in front of the wheel, the same as sleigh-shafts are hung. The shafts are held up by straps from end to collar, instead of saddle.

In England and Paris stagings are built by lashing straight tall poles together by ropes. In Milan and Venice they use the tall poles, but fasten together by hoop-iron. In Munich they use tall ladders, fastened with ropes, and I think I have seen them 80 feet high. I have seen them, natural growth, without splicing, sticking over the top of a three and four story building.

There is a good deal of building going on and nothing looks dull or sleepy. The architecture does not present the sameness that it does in France. There is a liberal supply of bronze statues and fountains. The river Isar flows to the north on the east side of the city. It is about half as large as the Sacramento, and has a white, muddy color.

Our time was so short here I did not have time to investigate much. There is not one in a hundred that can speak English, and therefore original information is pursued under great difficulties.

The wind is blowing from the north very fresh to-day, and is quite cool. I am very glad now that I did not get thin clothing at Venice, or I should have had a worse cold than I have now. Changing clothing with climate is dangerous, if it is agreeable.

Heidelberg

Is a romantic little place of 26,000 inhabitants (they claim it) in a valley between the high mountains, either side of the river Neckar. The river, about the size of Sacramento, flows from east to west, and most of the city is on the left or south bank. The two notable things of this city are its University and castle. To the efficiency of the former, many a professional man in the U. S. can testify, and to the latter all tourists make pilgrimage, buy ample supplies of photographs, and take copious notes. I thought I had seen castle enough to last me my lifetime, but I am very glad that I took a look through this remarkable one with its remarkable history. It is of red oak granite, on the side of a steep hill, overlooking the city. It is wonderful in stairways, arches, towers, banquet and audience halls, promenades and dungeons. I saw the stone bed where they used to roast a whole ox at a time, and the tall chimneys that conveyed the smoke and simmering fragrance to the sky above. In the large arches underneath, where teams could drive in and turn around, are three large wine casks, two of which I supposed were the large-

est ever made. In going a little further along, I saw one called the "Great Tun," constructed in 1741, having an interior capacity of 49,000 gallons. The staves were from six to eight inches thick. The hoops were made of timbers either natural or stam bent, and not more than one foot apart. In the museum room were shown relics connected with the castle, such as ancient horseshoes, chains, forks, swords, spears, helmets, haws, guns, etc. On the southeast, or upper side, is a mammoth pile of the castle still clinging together, that was undermined and blown down by the French invaders in 1689. They must have possessed a remarkable cement and quality of lime to cause this mass of rock to adhere so tenaciously for such a length of time. Twice has this castle been rebuilt and burned. It is an interesting study to read its history and contemplate the vicissitudes through which it has passed. On the mountain-side north of the city, grapes are grown and the land is terraced all the way up.

A brick building is being constructed on the side of the hill among the grapevines, and among the laborers I counted eight or ten women packing brick to it in tubs on their heads. Two good bridges span the river—one modern, iron and stone, the other wholly of stone, with six or eight arches, with a good deal of raise to center of bridge, and built over one hundred years ago. At the approach on the left bank is an arch with two towers, and with figures appropriately inscribed. The Roman method of notation is employed on nearly all monuments, statues or buildings in Scotland, England or the continent, and we have to go back to our school days when we were taught that system to learn the dates. I saw a steamboat running on this river without wheel or screw, which seems almost as preposterous as a bird without wings. She is a tow for canal boats, and I presume there are rapids, which is the reason she is so constructed. A chain runs through pulleys at either end and around a clutch windlass in center of boat. One end of this chain is fastened up stream and one down, at what distance I do not know; the windlass revolved with steam power; the chain pulled in at one end and let out or overboard at the other—not a very speedy, but secure, way of traveling.

As we were out walking this morning down the bank of the river, we saw a number of wine-cellar built right from the street into the side of the hill.

D. FLINT.

Woodbury Concentrators.

EDITORS PRESS:—At the Hathaway mine, Newcastle, Placer county, they have made a number of tests in the past ten months between the Woodbury, Frue, Victor (or Shaw), Garnier and Gates concentrators and the systems of riffle-boxes and canvas tables. After these tests, the company concluded that the Woodbury suited them best, handling the most pulp (from five stamps), and they have placed four Woodbury concentrators in their mill to work the pulp from 20 stamps. Mr. Woodbury is here at present superintending the erection of his machines. The 20 stamps are now running and crushing 50 tons in 24 hours. Everything in and about the mine and mill is in good running order.

There are other mines starting up around here. The Hathaway Co. is talking about larger works, by putting up four of Dodge's No. 2 pulverizers, so as to see what the difference will be between the stamps and the Dodge machines.

J. P.

Newcastle, Placer Co.

Mining in Costa Rica.

J. R. Stevens, an old California and Nevada mining man, returned from Costa Rica on the steamer San Blas, where he has been for the past four months, examining various mining properties. Mr. Stevens does not appear to entertain a very exalted opinion of the country lying back of Punta Arenas.

"The mines I visited," said he, "are about four leagues inland from Punta Arenas, the seaport, and are at an elevation of about 1200 feet above the sea. There are two gold mines at that point, one called the Trinidad, worked on a small scale by an English company, and the mine of the Cerro del Aguacate, one of which is worked by a company called Compania de la Montana del Aguacate. There is still another called the 'Saora Familia,' a little north of the last-named mine, and at an elevation of about 3000 feet above the sea. It has a vein of gold quartz similar to the Trinidad, but is worked on a very small scale.

"Gold deposits are also said to be on the Atlantic slope, in the Indian country, but their existence is very uncertain."

Mr. Stevens would not advise Californians to go to Costa Rica to look for paying gold mines. Everything is quiet politically, the first election in the country having passed off in an orderly manner last November.

Mr. Stevens says a number of new railroads are about to be built in the State of Tehuantepec by English capitalists, and then a large amount of fine land suitable for coffee plantations will be opened up. In Costa Rica such land is held at \$200 per acre, while in that part of Mexico it can be bought for \$15 per acre, and the climate is about the same.

Banking.

[Written by a member of the "Q" Chataqua Circle, San Francisco.]

The Jews in the ancient Italian towns were in the habit of sitting in the market-places and there loaning money to those who might wish to borrow. They would sit on benches, the Italian for which word is "banco," and hence comes the word bank. Shakespeare evidently gets his character of Shylock from this custom.

Banks are established to afford a safe place of deposit for the money of individuals, corporations and governments, to facilitate the transfer of money from one person or party to another, and for the granting of aid by the loaning of money.

The Bank of Venice, founded in 1171, was the first institution of its kind in Europe, and owed its existence to the Crusades and the necessity of the Government obtaining money to conduct these wars. Various other banks were started from time to time in different cities of Europe. Finally the Bank of England was established in 1694, during the reign of William and Mary. To the war with France and the extreme difficulty experienced by the Government in obtaining money, is this monopoly due. Like the Bank of Venice, it owes its existence to the wants of Government, which gave it life. The idea first originated with William Patterson, a merchant of London, who readily saw that a Government which had been paying from 20 to 40 per cent per annum would without much hesitation grant exclusive and almost unlimited privileges to any institution which would furnish a fixed and permanent loan at a reasonable rate of interest. The plan being brought to the notice of the King, was immediately approved, and the bank was incorporated under the title of "The Governor and Company of the Bank of England," with a capital of £1,200,000. This bank granted the Government loans of 8 per cent per annum.

All the first banks were established to obtain money for the Governments, for their wars and other expenses.

In the year 1791, when the United States Government was in rather bad straits as concerning money matters, the question arose as to whether money should be raised for Government expenses by increased taxation or by loans made through a bank which Congress was then contemplating establishing. Through Alexander Hamilton's efforts, the latter plan was adopted and the "Bank of the United States" was founded with a capital of \$10,000,000, of which the United States was to subscribe \$2,000,000. Its charter was to run for 20 years. Hamilton had observed that national banks had been successful in Italy, Germany, Holland and France, and the Bank of England was to all our countrymen the synonym of financial stability, and he felt sure his plan would succeed. His hopes were not unfounded, for it aided the Government very materially in securing the needed money. In 1811 its charter expired, but it would most certainly have been renewed by Congress but for the fact that the bank had fallen into private hands, and it was feared it would become a monopoly.

Two kinds of banks come to notice in more recent years—first, the Savings Banks. These banks receive from depositors money for safe-keeping, and also allow a small rate of interest on such money; but their functions are different from the second class, namely, the Commercial Banks, which seldom if ever allow interest on deposits. The Commercial Banks will chiefly be spoken of in this article. They may be divided under two heads—the National Banks, established under United States laws, and the State Banks, incorporated under State laws. The latter are examined at least once each year by State Bank Commissioners, who may examine the condition of the bank at any time unexpected to the officers of the institution. The National Bank is very similar to this, except that it is examined by United States Commissioners sent from Washington. The object of these commissions is, by examination into the condition of the bank, to ascertain if the management is careful as to the kinds of securities it receives on loans. The National Bank when being established is compelled to have a certain number of United States bonds, either \$50,000 or \$100,000 worth, as the case may be according to its capital. These bonds it deposits with the Controller of Currency at Washington, who in return gives the bank National Bank notes to the extent of 90 per cent of its deposit of bonds. These notes the bank may loan out with the exception of 25 per cent, which must be kept as a reserve fund to redeem any notes which may be returned to it. Some bankers claim that there is an advantage in the National Bank over the ordinary commercial bank as regards profits, as they get profits on their money twice, namely, 4 per cent on the bonds which they deposit at Washington, and 6 or 7 per cent on the notes which they receive in exchange for these bonds. But all bankers do not feel that these advantages compensate for certain restrictions which are put upon National Banks. This is why all banks do not incorporate under national laws.

The first thing necessary in establishing a banking business is to secure the capital, which serves as a partial guarantee to depositors that their money will be kept in safety. Then comes the election of officers and directors, if the business be a corporation. Its officers are known and reputable men interested in other enterprises, with the welfare of the community at heart, who seek their own in others' prosperity, and whose aim is to keep their bank a safe and sound institution, yielding a fair rate of interest on honest transactions.

The bank runs its affairs like clock-work, opens and closes at regular hours, uses everybody alike, and treats all business as confidential.

Mr. Walker is a customer of the bank. He

is engaged in the commission business, which is very active, and consequently he has an active bank account. He is honest and frank in his dealings with his banker. He deposits his money in the bank to keep it safe and to have it convenient to check against for funds as needed. He deposits his checks, drafts and notes, as the bank is better prepared to collect them. He gets his exchange at the bank, because it is the most convenient method of remitting money from one point to another, and the bank is at all times prepared to furnish him such exchange at lowest rates. He borrows money from his bank, because he is there known best, and the bank is always ready to give its customers preference in making loans, both as regards rate and amount. He goes to his banker for recommendations, for information, for assistance and for advice. He expects fair treatment from the officers and courteous attention from the clerks, and wants his transactions with the bank made known to no one outside.

When leaving his signature at the bank, he

National Bank of Boston or to whoever may be his correspondent there, with the instructions that upon payment of the amount of the invoice by Brown, Craig & Co., the shipping receipt he delivered to them. Why does Mr. Walker employ his banker in this case? Because he knows that his banker has responsible agents in Boston, who will collect the money from Brown, Craig & Co. before delivering the shipping receipt to them, and they have no control over the goods until they possess this receipt. What becomes of the money paid to the Boston bank? As soon as they receive it they telegraph to the San Francisco banker, using their cipher code. The message reads like this: "Engine Walker lag steam hope Pleides." The San Francisco banker examines his code and finds that this means: "Draft of Walker on Brown \$3000 for shipment of beans, paid." Then Mr. Walker's account is credited on the books of the San Francisco bank and the First National Bank of Boston is charged with the amount.

Mr. Walker has received goods from Mann,

Wild Rye Grasses.

Since the perennial rye grass which came to us by way of Australia (and thus earned the name Australian rye grass) has become so popular in some parts of California, there has been frequent mention of the wild rye grass which seems to be wild in this State, and there has been some confusion in the local mind as to the different genera which popularly go under the name rye grasses. The grass which is usually meant by the term rye grass in this State is *Lolium perenne*, and there is another species which is more or less conspicuous as the cheat of the wheat-fields of some parts of the State, which is *Lolium temulentum*. The resemblance between these two is close enough to enable a careless observer to class them together.

There is another genus the species of which are also called rye grasses, and that is the genus *Elymus*, of which two American species are figured on this page. These are both shorter

but it is a more slender grass in all its parts, varying from smooth to pubescent. The spike is three to four inches long, cylindrical, and inclined to droop. The glumes are more slender than *E. Virginicus*, with longer awns. The spikelets are usually two flowered, the empty glumes narrow, rigid, and about one inch long. The body or dilated part of the flowering glume is oblong, about four lines long, and tipped with a slender awn an inch or more in length. This species grows in rocky woods and on river banks, and it is said by some to furnish a good hay.

REDUCED FREIGHT ON ORE.—B. Campbell, general freight agent of the Union Pacific, after consultation with mine-owners in the Coeur d'Alene mines as to the freight rates necessary to secure a liberal movement of ores, has fixed rates as follows: On crude ore, carrying less than 40 per cent of lead, to Missouri river points, \$12; to San Francisco, \$10 50. Ores carrying 50 per cent of lead and over, to Mis-



TWO WILD RYE GRASSES—*Elymus Virginicus* and *Striatus*.

is supposed to write his name with the same natural and careless ease as he would at his own desk, and he should endeavor to write it the same at all times. Thus his signature will become as characteristic and recognizable as his face, and the possibility of successful forging is much lessened.

Mr. Walker receives a shipment of wheat, to pay for which he has not sufficient funds. He goes to his banker and states the case to him. The banker examines the quotations in the daily paper and finds that wheat is selling at \$1.40 per bushel; so he tells Mr. W. that he can loan him \$1.20 per bushel provided he has the warehouse receipts. Mr. Walker then places the wheat in some responsible warehouse, and taking the receipts to his banker, has the amount of the loan placed to the credit of his account at the bank, so that he may check against it the same as against any deposit he may have made from time to time.

Mr. Walker is in the habit of shipping beans to Brown, Craig & Co. of Boston, and wishes to collect the amount due him on shipments made to them. He prepares the invoice, which is merely a statement of the goods sent, and also the shipping receipt, which is a receipt from the railroad company that they have received certain goods marked B. C. & Co., which are to be forwarded to Boston. These papers he takes to his banker, who forwards them to the First

Bell & Co., New York, and wishes to send them the amount due for such goods. He goes to his banker and buys New York exchange, which is an order of the San Francisco banker on the Mercantile Bank of New York to pay Mann, Bell & Co. a certain sum of money. This order Mr. Walker mails to Mann, Bell & Co. They indorse it on the back, thus acknowledging the receipt of the money, and present it at the Mercantile Bank and receive payment.

These transactions of Mr. Walker include the principal operations of a bank. Of course there are other details of business which the banker performs, such as the buying and selling of stocks for clients and the issuing of letters of credit on the principal cities of the world; but these are minor affairs compared with the loaning of money, the buying and selling of exchange and the making of collections.

THE NAPA CONSOLIDATED.—B. M. Newcomb, superintendent of the Napa Consolidated Quicksilver mine, makes the following statement, showing the production of and shipments from the mine during the year 1889: January, 385 flasks; February, 400; March, 380; April, 320; May, 445; June, 415; July, 340; August, 450; September, 360; October, 385; November, 380; December, 330; total, 4590.—*Napa Register*, Jan. 2d.

in the head, more bearded and otherwise different from the species which is most abundant in this State, and is called "giant rye grass" (*Elymus condensatus*), but they all are different enough from our species of *Lolium* to enable one easily to pronounce them distinct from the more valuable kinds.

The species which are shown by the reproduction of engravings from Dr. Vasey's reports are first, *Elymus Virginicus*, a coarse perennial grass, growing on alluvial river banks, or in rich low grounds. The culm is rather stout, two to three feet high, leafy; the lower leaves are 10 to 15 inches long, broad and rough. The sheath of the upper leaf usually incloses the stalk and sometimes the base of the flower spike. This spike is erect, dense and rigid, two to four or five inches long and one-half inch thick. The spikelets are two or three together at each joint, all alike and fertile, sessile, two to five flowered, and each with a pair of empty glumes. These glumes are very thick and coarse, strongly nerved, lanceolate, and bristle-pointed, about one inch long. Prof. Killebrew of Tennessee says it is very valuable and ought to be tried in cultivation.

The other species is *Elymus striatus*—"Smaller Wild Rye grass." This grass has a structure as to the flower-spike similar to the preceding,

sonri river points, \$16; to San Francisco, \$12.50. But little ore has been shipped from Coeur d'Alene of late owing to the high rates charged by the Northern Pacific. It is supposed that this reduction of from \$5 to \$10 a ton will cause a greatly increased output, and that the shipments will be 150 tons a day and more after awhile.

COMSTOCK BULLION.—The December bullion yield of Comstock mines aggregates in round numbers about \$620,000, divided as follows: Con. Cal. and Virginia, \$300,000; Savage, \$45,000; Alta, \$30,000; Hale and Norcross, \$100,000; Justice, \$25,000; Yellow Jacket, \$40,000; Crown Point, \$55,000; Occidental, \$15,000; and Overman, \$10,000.

STEAMERS' RECORDS.—The Peninsular & Oriental Steam Navigation Co. owns a fleet of 72 steamships of 190,270 tons and 189,000-horse power. Last year the fleet steamed 2,500,000 miles, "without accident or delay." There is a record worth talking about.

THE TIDES ON THE ISTHMI.—At Aspinwall on the Atlantic side of the Isthmus of Panama the rise of the tide is only 1½ feet, but at Panama on the Pacific side there is at times a difference of 21 feet between high and low water.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—*Ledger*, Jan. 4: The ten-stamp mill resumed operations last Tuesday, and a steady run for a considerable time is anticipated. The ore is being taken from an open cut 60 feet long and 30 feet wide. Everything is put through the mill. The formation is broken up, as a well-defined ledge could not reasonably be looked for at such a depth. We are told by the superintendent that the rock sent to the mill averages between \$4 and \$5 per ton. At this rate, when fixed up to work economically and on a large scale, the mine ought to pay handsomely. There is a shaft on the property which, however, is only 60 feet deep, and it is not being worked at present. Seven men are employed—five in the mine and two at the mill. The property has been listed on the stock board in New York. At the present ten-stamp mill they have only 90 feet fall, consequently the cost of water-power is a material item. It is proposed to increase the milling capacity to 20 stamps, and to bring water direct from the Amador canal through an 11-inch pipe. This will necessitate a pipe-line 7000 feet long. The survey for this line was made this week, and we are told the work will be pressed forward to completion as speedily as possible. Altogether the cost of the contemplated improvements is estimated at \$20,000. The claim embraces 1700 linear feet by 450 in width. Some rich pockets were met with near the surface.

ANADOR GOLD MINE.—At this mine there are about 80 men employed. The owners in London are clamoring for the completion of the mill. They of course do not realize the condition of the roads, and therefore cannot understand why the mill remains at a standstill so long. It is an utter impossibility to get any teamster to undertake the hauling of the rock-crusher and other heavy material while the roads are so bad. Indeed, the outlook is not favorable for getting this machinery on the ground until the winter is over.

MISCELLANEOUS.—Most of the mines are greatly troubled from the increase of water necessitating the running of the pumps a considerable portion of the time. At the Zeile the lower level is flooded. This, however, does not cause much difficulty, but if the flow of water continues, it will be hard to keep the mill going and at the same time prevent the water from flooding other levels. A 15-inch pipe 1500 feet long has been laid from the Kennedy reservoir to the mill, which will hereafter be operated by water-power.

Butte.

GOLD AND COPPER.—*Oroville Register*, Jan. 6: From the Stow mine, Forbestown, 3000 pounds of pure copper have been extracted and shipped below during the past few weeks. The copper is pronounced by experts to be equal to any in the world. The Stow and Golden Queen mines at Forbestown are panning out in a surprising manner. Since the erection of the latest improved chlorination works, there, \$1000 a month is being saved that has heretofore been lost in the refuse. The rock is very high grade in gold, and the sulphurets are exceedingly rich. Other improvements in gold-saving machinery are being put in, and the rock is expected to average \$250 a ton.

El Dorado.

STOPPED WORK.—*Placerville Observer*, Jan. 6: The present stage of bad weather has stopped work on the Taylor mine, near Garden Valley. The new company taking hold of the mine will rebuild the surface works, putting in new hoisting works and 20 stamps, with room for 20 more. Things will be lively on this mine as soon as the weather permits of surface workings.

HENRY'S DIGGINGS.—Water will be abundant next summer for mining. L. L. Alexander has stopped work at the Crystal mine, but is still at the mine. John McLane and J. Ryan are still at work in the Oak mine, with good prospects ahead. William Armstrong has out a big pile of gravel, taken from the Old Stand-By at Henry's Diggings. The Carrie Hale mine is lying idle for the want of an owner and miner.

Fresno.

HILDRETH.—*Cor. Fresno Expositor*, Jan. 12: Things were lively for awhile around the old Hildreth mine, pioneer of the district, named after the late illustrious Tom Hildreth, from whom, by the way, the town also derives its name. This mine has had rather a checkered career, proving at times the joy and sorrow of its many owners, but owing to bad management and other adverse circumstances it has never paid any large dividends. Some very remarkably rich strikes have been made there, however, and the present owner, Wm. Dunphy of San Francisco, is well aware of the fact that it only needs to be properly handled to prove a paying proposition. T. P. Peck and Geo. Hildreth, Mr. Dunphy's right hands, were with us recently looking after assessment work and getting everything into shape for future operations. Mr. Peck was well pleased with the outlook and told us he hoped to see a general resumption of work on the mine early next spring. Responsible parties are negotiating for a lease of the Abbey which proved so long the mainstay of the town, and although the final papers have not yet been drawn up we understand that no serious hitch lies in the way of a satisfactory agreement between the interested parties. The syndicate operating at the Zoller mine is from latest accounts making good headway, getting out plenty of ore and finding a better prospect the more they proceed with development work. The rough weather, however, is giving them some trouble with the crushing of rock and has likewise seriously retarded business at Zebra. Here we understand it has necessitated a total suspension of work, which it is to be hoped will prove only temporary.

Inyo.

GOOD MINING REGION.—*Inyo Independent*, Jan. 6: Mr. G. A. Smith, a real estate dealer and mining speculator of Los Angeles, made a trip recently through the Darwin and Panamint country and got back to Independence at the beginning of this week. He says that over a wide region of country he saw many mining claims that he is confident would pay good profit if rail transportation could be had for

the ore. Immense quantities of ore are in sight that is too low grade to pay for hauling 70 or 80 miles by wagon as must now be done to get it to a railroad. But if the railroad were within easy reach all of this ore would be taken out, affording employment for many men and much capital. Mr. Smith bonded an antimony mine from Mr. Hannigan situated on the Death Valley side of the Panamint mountains. Mr. Smith says this is a large deposit of antimony, and he has no doubt the mine will be a valuable property if worked. He was induced to go into that country in the hope of the speedy extension of the railroad from Salt Lake to Los Angeles, but until this extension shall be made the property has no value. He felt discouraged by recent reports that the road would not be extended beyond Pioche and said that his firm would not now expend any money in opening the mine.

THE ALEXANDER MINE.—Scott Broder and his partner, Acunha, are working the Alexander mine in Wauchoa. Several years ago John Alexander took out the first ore from this mine; it was found close to the surface, and was very easily mined. The second-class quality of the ore gave 17 ounces silver per ton and 44 per cent lead. At the prices then paid for silver and lead, the ore was worth \$55 per ton. The rest of the ore gave 24 ounces silver per ton and 56 per cent lead. This ore was then worth about \$68 per ton. The cost of getting out the ore to the railroad was so great that Mr. Alexander made but one shipment of 11 tons and then quit work upon the mine. For packing 1 1/4 miles to where the ore could be reached with wagons the charge was \$3 per ton. He had also to provide water for the pack animals at an additional cost of \$5 per barrel, or nearly \$2 for water against each ton of ore. The cost of hauling by wagons to the railroad was \$4 per ton. Then railroad freight and cost of working added to the other expense left nothing for the miner. Now the ore can be got out and worked at far less expense than before, and the prospect is good that a fair margin of profit will be left for the miners. The mine is but little over 13 miles distant from Alford, on the C. & C. railroad.

CERRO GORDO.—The combination shaft at Cerro Gordo is retimbered down to the Omega tunnel, a depth of 300 feet. To the next tunnel below, the distance is between 300 and 400 feet, and the work of timbering down to that point is being pushed as rapidly as possible.

ORE.—In doing assessment work in the Beauregard mine at Cerro Gordo, Jack Dunphy has struck some fine ore. The extent of the body cannot yet be determined, but it looks as if there might be a good deal of it. Dunphy recently purchased a controlling interest in the property.

ANTIMONY.—Joe Danielson, John Curran and William Hannigan have bonded antimony mines in Wild Rose mining district to G. A. Smith of Los Angeles for \$3000. Mr. Smith intends to develop the property, and if satisfied with the result, will build reduction works near the mines.

FOUND GOLD.—*Inyo Index*, Jan. 1: In his search for lead ore in the old Uncle Abe mine, Mazurka Canyon, Phil. Cartier struck a fair-sized ledge of gold ore that promises to become a good mine. Several specimens sent to town are rich in free gold, and the quartz is of excellent character.

CHLORIDING.—Ben Laskey tells us that there are now 14 men chloriding at the Keynot mine in Beverage district. A bunch of very rich ore was struck the other day, the extent of which is not yet known.

LOOKOUT.—*Register*, Jan. 2: Through a private note from Lookout district, we learn that Supt. Frank Fitzgerald of the Modoc Consolidated is working nine men at \$3.50 per diem, five at \$3.14, and two at \$4.50 per month and board. Since November 18th, he has been concentrating and jiggling the old dumps. The result of the first two carloads shipped was as follows: Concentrations from rocker, 70 ozs. silver, 31 per cent lead. Concentrations from jigger, 166.6 ozs. silver, 54 per cent lead, and gold at the rate of \$7.02 per ton. These dumps will last nine months or more, and will furnish steady employment for 20 or more men during that time.

Kern.

METALLIC ANTIMONY.—*Kern County Californian*, Jan. 4: A. Blanc, a gentleman from Oakland, who has been having some mines prospected on Erskine creek, discovered a curious-looking ore which he took to San Francisco for determination. It puzzled almost all the experts until by analysis it proved to be native antimony and almost chemically pure. The occurrence of metallic antimony in a native state is only once before known. In a scientific paper published over a hundred years ago, mention is made of the discovery at Auvergne, France, of a small deposit of pure antimony. The metal is fine-grained, with steely fracture, and has puzzled all the metallurgists. It is not expected that much will be found, but from its rarity to find any at all may be considered a metallurgical event.

Lake.

SILVER MINES.—*Clear Lake Press*, Jan. 3: Last week we had the pleasure of examining some of the ore from the newly discovered silver mines across the lake mentioned in a former article. The owners were confident that they had struck a bonanza and were shipping some of their ore to the city to have it worked, a much more satisfactory way of determining its value than an assay made from choice pieces of ore. The general character of the rock seems to be a decomposed quartz carrying a heavy percent of chlorides of silver; there is also quite a sprinkling of gray quartz in which native silver can be very easily traced. Many croppings are found in that neighborhood.

Mariposa.

PLACERS.—*Cor. Mariposa News*, Jan. 4: Placer mining is now generally conceded to be a dead industry, a relic of '49, and the special object of adverse legislation. Mariposa placers and gravel claims, rich and numerous as they were in early days, have hardly been worked. The surface mines were exploited in primitive ways and deep diggings left undisturbed. Claims that did not yield \$5 or \$10 per diem were considered unproductive and were abandoned. A subsequent series of dry winters, scarcity of water due mostly to the improvidence of early settlers in not securing water rights, were the main facts of placer mining being discontinued, while the excitement that followed the discovery of quartz mines diverted the attention to other channels. Enormously rich banks of gravel still exist in our county, and the present wet winter will give the "gambusino" a show to prove it. At

Phillip's Flat there is one of the richest gravel banks in the State. It is the old river channel running in streaks parallel with the present course of the stream and pays all the way from five cents to \$25 per pan. This is not exaggeration, for there are men in our vicinity who have worked these and whom scarcity of water drove to more remunerative employment. Hundreds of thousands of dollars were taken out in early days. The flat originally held 40 or 50 acres; of these some 10 or 12 only remain on the upper part, and it has always been considered the richest, and is still left undisturbed, mostly on account of a high bank of cement that had to be blasted. In 1880-81, the owners, Messrs. M. Bauer and T. Branson, did a great deal of dead-work and ran a tunnel from the river to the old channel, blasting every foot of the way. Lack of water has since prevented further operations, but now things have somewhat changed. With a 40-foot fall, a 2-foot hose with a 2-inch nozzle, they are at work, and as the stream strikes the bank, earth, gravel and boulders come tumbling down at a lively rate, and find their way to the river through a long string of sluice-boxes, leaving the shining gold on the bottom. Although Mr. Branson says that he calculates the season's returns will go from \$10,000 to \$15,000, experienced miners think he will fall short of the mark. Were we to have the water facilities other counties are blessed with, we would not feel the weight of the Mariposa Grant banging on our necks, and would pull through anyhow.

CHINESE ON THE GRANT.—*Mariposa News*, Dec. 28: A communication appeared in the last issue of the MINING AND SCIENTIFIC PRESS, in which the correspondent says that Chinese are exclusively employed on the Grant, in the mine at Bear valley. This is a mistake. At times it is found necessary to employ a few Chinese there doing work that white men will not like to do, and then only for a few days.

Napa.

THE NAPA CONSOLIDATED.—*Register*, Jan. 3: B. M. Newcomb, superintendent of the Napa Consolidated Quicksilver mine, favors us with the following statement showing the production of and shipments from the mine during the year 1889: January, 385 flasks; February, 400; March, 380; April, 320; May, 445; June, 415; July, 340; August, 450; September, 360; October, 385; November, 380; December, 330; total, 4550 flasks.

THE KNOXVILLE MINE.—James Raphael, foreman of the Knoxville mine, says the roads between here and Knoxville are in a terrible condition, but he managed to get through on horseback. Of the mine he says it is closed down for the present. There is an abundance of ore, but because of bad roads they can neither get anything in nor out. The new engine shaft is running night and day. It is now at a depth of 160 feet. When a depth 40 feet lower is reached a station will be established and a crosscut will be made into the ledge. With passable roads again the mine will be running in full blast.

QUICKSILVER SHIPMENTS.—*Calistogan*, Jan. 1: There were shipped from Calistoga during the month of December, flasks of quicksilver produced at the mines as follows: Bradford, 183; Napa Con., 275; Gt. Western, 116; Sulphur Bank, 159. Total flasks, 733. Exclusive of the above there were 25 flasks received yesterday from the Bradford mine, but as they were not shipped from Calistoga until after the close of December, they will be included in January shipments.

Nevada.

MINING DRAWBACKS.—*Grass Valley Union*, Jan. 7: The storms of rain and snow which have so persistently prevailed this winter have not seriously interfered with quartz mining in this district up to the present time, although the pumps have been required to do extra duty in keeping the water in the mines under control, and since the heavy snowstorms have come there has been a constant apprehension of snowslides along the line of the ditches that supply water-power for the mines and mills. Such accidents have not yet occurred, and the amount of water carried in the large ditches may prevent them freezing up, but with the temperature getting down to within a few degrees of zero, that misfortune may occur at any time. The cold weather of yesterday interfered with milling, as the quicksilver plates on the aprons would not take up the gold readily, and there may be a temporary shutting down of the mills until the weather becomes more mild.

FROZEN UP.—*Tidings*, Jan. 6: The snow and frigid temperature has resulted in difficulties at the mills and mines. The Pittsburgh's supply ditch is frozen, and the steam plant is being utilized for hoisting and pumping. The Idaho mill is froze up, and operations have been suspended until the weather moderates. At the mine, however, operations are proceeding full blast. The pump-rod at the Empire broke Saturday night, and that at the North Star Sunday night, necessitating delays of several hours. As is the case at the other mines of the district, water is at present giving no little trouble and anxiety, the pump at the North Star being run at double the usual speed. Four feet of snow at Bloomfield and six feet at the Derby. The Derby mine has been shut down temporarily, because the ditches are frozen and water for the boilers cannot be had. A prolonged cold snap and the formation of ice in the South Yuba canal, from which water for power is derived by Grass Valley's principal mines, is feared. The ditch crew have been reinforced, we understand, and no expense will be spared to keep the canal open.

THE PEABODY.—*Transcript*, Jan. 3: The work of pumping out the Peabody mine at Grass Valley was completed this week, and Supt. Tilley now has his men at work enlarging the shaft. Sinking will be commenced as soon as the work of enlarging is completed.

Placer.

FOREST HILL DIVIDE.—*Placer Herald*, Jan. 6: Mining as it has been for years still claims the attention of most of the people, and probably will until the gravel beds are worked out. No startling developments have been made during the year, although much labor has been expended. The Gray Eagle Co., early in the spring, succeeded in sinking a shaft 350 feet in depth to good gravel. They then turned their attention to running a tunnel that should tap the channel and drain it. The tunnel is now over 500 feet in length. The rock is a soft black slate, and consequently admits of rapid progress. Anthony Clark has started another tunnel farther up Owl Creek to tap the Wolverine, a claim

adjoining the Gray Eagle. There has been but little mining either at Todds Valley or Yankee Jims during the year. Some work has been done on the Red Sea at the latter place, and C. Trafton has uow a tunnel about 800 feet in length in his Georgia Hill claim. At Forest Hill there is but little mining going on except at the Mayflower. Work on a large scale was suspended last spring at the Dardanelles. Several men are at work there now. The Baker Divide Co. is drifting, and would, if all their upraises and drifts had been put into the main tunnel, have been in between 6000 and 7000 feet. The Mayflower gives employment to the usual force, and shows no abatement in its output of dust. The mill has been running almost steadily since it was started on Dec. 11, 1888. Twenty stamps have been in operation the greater part of the time. The yield in gold for the year ending Dec. 11, 1889, was \$330,000, and for the month of November, the mine paid \$34,000. For the last six months the principal part of the work has been done in the north gangway. The yellow deposit with its black gold has been cut through and connection will be made shortly with the old ground which paid so immensely in 1886. The old Paragon at Bath has been heating its record for the last few months. This mine has been one of the richest in the State. It was worked in 1880 by George Webster. In 1862 A. Breece, Judson Wheeler and W. A. Freeman owned it. Mr. Freeman afterward sold out and went to Oakland with a fortune. Messrs. Breece & Wheeler have owned the mine since then, and have consolidated with it the Mint and Rough Gold. There are two channels, an upper and lower. The upper was rich, but never paid so regularly as the lower. No work has been done on this for years. The tunnel in the lower channel is now 9240 feet long. The pay dirt where work is now going on is six feet in depth and very rich. Gangways and crosscuts are being run in order to block out the ground so that a large force of men can be put to work. The channel here is 60 feet wide, and on one side yields \$60 to the carload or ton of gravel. Mr. Breece has taken out as high as \$3000 to the pan in this claim, and in one crevice last winter he took out \$15,000. It is a remarkable mine, and there appears to be no end to its richness. It has always paid big dividends from the time it was opened. According to latest reports no mining has been done at Michigan Bluff since last winter. W. Muir is operating at the Oro near the Weske, and is taking out some gold. The Hidden Treasure tunnel is now 3300 feet in length and in rich ground. Some idea of the amount of work that is done in this mine may be gained from the statement that 200,000 laggings and 40,000 caps and posts are used yearly in the tunnel, drifts and crosscuts.

San Diego.

ANOTHER GOOD STRIKE.—*Julian Sentinel*, Jan. 1: Last week another new strike was made in Banner. This time it was in new ground, and by three deserving lads who have been wont to swing a hammer and shove a drill in this camp. The boys are miners from way back, and know a good thing when they see it. The ledge is well-defined, about eight inches in width, and will mill \$60 per ton on the surface. This strike is proof of what we have always contended that this camp is not half prospected yet.

PINE VALLEY.—*San Diegoan*, Jan. 2: The Hawkes Brothers and others, who are in from the Pine Valley mining section, are much elated over the prospects in that locality. To-day they interested a number of miners by showing specimens of rich quartz from claims which they have, situated about half-way between Noble's camp in Pine Valley and the Stonewall mine at Julian. "In 30 years' experience," said one, "I don't think I ever saw so many acres of rich rock in any one place—ore that runs \$100 to \$500 and up to \$1000 to the ton. Take a piece of quartz in almost any place, the size of your thumb, and you can get upward of a hundred colors from it. Within a radius of a mile and a quarter from our camp there are not less than 30 claims, any one of which is as good as the average run in the Alamo, and with the added advantage that it is all under the American flag." Governor Waterman's son, who is in charge of the famous Stonewall mine, was over in Pine Valley the other day to satisfy himself as to the truth of the reported rich finds there. According to the statement of one of the prospectors now in the city, the Governor's son was astonished at what he saw, and he predicted a very prosperous camp when developments are well under way. The Pine Valley section is quite cool during the winter—snow not infrequently falling there. This season, however, the weather has been very mild, in fact there is seldom a month in the year that mining cannot be carried on. The average climate is delightful; there is an abundance of wood and water, and from all accounts the field is a most inviting one to industrious miners. Pine Valley is bound to come to the front.

Shasta.

SQUAW CREEK.—*Cor. Redding Free Press*, Jan. 4: The Uncle Sam mine is running with a full force, there being about 60 men employed. Several of the laborers have moved their families in here and they expect to have a school in the near future. L. J. Fader is running three four-horse freight wagons into the Squaw Creek mines; also a daily stage.

DRY PROCESS.—The large new mill of the Calumet company, for working gold ores by Paul's new dry process, is now completed and will commence running the coming week. This is the second mill the company has built in the past year for the same process.

Siskiyou.

SOUTH FORK OF SCOTT RIVER.—*Cor. Yreka Journal*, Jan. 8: All of the mines on the South Fork are in active operation although considerable snow has fallen. Those who had their mines well opened before the winter snows set in have no trouble in working their claims. The claim sold by Alex Parker to a Chinese company, for the mod-st little sum of \$50,000, is turning out several thousand dollars monthly, and is considered by all miners here to be one of the best mining properties in Northern California. The old Fosch claim opposite the town of French Flat is also owned by a Chinese company, and the receipts of this claim amount to \$300 and \$400 weekly, in fact the Chinese own the South Fork for a distance of four miles, with the exception of a few hill drifting claims, just above the town, which have been steadily worked for a number of years. Boulder creek, Fox creek and Jackson creek, tributaries of the South Fork, are owned and worked by white men. The snow on these creeks is five

and six feet in depth and still piling up, but most all the claims are drift diggings where the rich auriferous dust is brought to the surface through tunnels preparatory for spring washings. A number of men are wintering here from the North Fork of Coffee creek, Trinity county, where they have good claims, to which they will return as soon as the winter storms are over.

NEVADA.

Washoe District.

BEST AND BELCHER.—Virginia *Enterprise*, Jan. 4: On the 625 level, east crosscut No. 1 has been extended 12 feet; total, 90 feet. Formation, soft porphyry. On the 1000 level, east crosscut No. 1 has been extended 14 feet; total, 70 feet. Formation, hard porphyry. On the 1200 level, commenced repairing the station on December 29.

GOULD AND CURRY.—On the 200 level the southwest drift has been extended 18 feet; total, 268 feet. Formation, quartz, clay and porphyry. On the 400 level, in west crosscut No. 2, at a point 122 feet from the south drift, have started and advanced a southwest drift a distance of 30 feet. Formation, quartz, clay and porphyry.

SAVAGE.—On the 300 level have resumed work in the face of the main west drift from the station, and made during the week 32 feet; total length, 475 feet. From the top of upraise No. 1, from the southwest drift on the 400 level, advanced 16 feet in low-grade quartz, and connected with the north stope in the Hale and Norcross mine. This connection gives ample ventilation to prospect the ground south from the upraise. Are extracting ore from the 400, 500, 600 and 750 levels. Milled during the week 435 tons of ore. Have bullion on hand and at the mill amounting to \$29,978.48.

ALTA.—Are still sinking the winze in the ledge below the 925 level. The stopes between the 825 and 925 levels are looking well, and the mill reduces daily about 45 tons of ore.

CON. IMPERIAL.—West crosscut No. 2 from the 300 level north drift is out 71 feet, 29 feet having been added during the week; face shows quartz with occasional bunches of ore. The north raise from the same level is being repaired. West crosscut No. 1 from the 500 level drift is out 98 feet, 26 feet added during the week; face in low-grade quartz, and the main north drift itself on the 500 level is out 253 feet from the shaft; 31 feet added during the week; face in a mixture of quartz and porphyry.

CONFIDENCE AND CHALLENGE.—The Confidence-Challenge joint west crosscut from the 300 level north drift is out 120 feet, 17 feet having been added during the week; face shows quartz and porphyry.

YELLOW JACKET.—The west drift on the 500 level is out 900 feet. Crosscutting on the 900 level. Shipping to the Bunswick mill 60 tons of ore daily.

SEG. BELCHER.—During the week the west crosscut on the 1000 level was advanced 29 feet; total length, 79 feet; face in porphyry seamed with small strings of quartz.

CROWN POINT.—Have cleaned out during the week 17 feet of the old 160 level west crosscut; total length cleaned, 90 feet. Resumed work during the week in the east crosscut and advanced it 22 feet; total length of crosscut to date, 150 feet; face in quartz and porphyry. The stopes in the mine show no change since last report. Milled 456 tons of ore during the week, the average value of which was \$15.45 per ton.

BELCHER.—The east crosscut on the 850 level was advanced during the week 15 feet; total length, 44 feet; face in quartz and porphyry. The east crosscut south of shaft on the 200 level has been advanced 17 feet; total length, 45 feet; face in low-grade quartz, assaying from \$5 to \$10 per ton. The south drift on the 200 level is out 133 feet, having made 21 feet during the week; face in clay and porphyry. During the week a shaft station 158x7½ was excavated and timbered on the 600 level, and a drift started south from it.

JUSTICE.—The 822 level north drift has been advanced 6 feet during the week; total length, 127 feet. The 622 level north drift has been advanced 37 feet; total length, 541 feet; face in low-grade quartz and porphyry. Have started an upraise from the southwest drift on the 490 level, with fair prospects of finding ore; the upraise is now up 15 feet from the track floor. The stopes are looking well and are yielding the usual quantity of ore. Shipped to the mill during the week 227 tons of ore, the average value of which was \$23.87 per ton.

CHOLAR.—The north drift on the 750 level is out 760 feet; face in clay and quartz giving low assays. The north drift on the 930 level is out 309 feet; face in hard porphyry.

POTOSI.—East crosscut No. 3, 520 feet south of the line, 650 level, is out 80 feet; face in quartz and porphyry. The east crosscut 560 feet south of shaft, 930 level, is out 190 feet; face in clay and quartz.

EXCHEQUER.—The 500 level east crosscut on the north line is out 58 feet; face in quartz and porphyry.

ALPHA.—The 500 level west crosscut 100 feet north of shaft is out 383 feet; face in clay and quartz. Are cutting out for a winze station and sunk on ore found in the east crosscut 60 feet north of shaft. The north drift on the 600 level is out 75 feet; face in quartz, giving low assays.

CON. NEW YORK.—The only work done in the mine the past week has been repairs in the north drift on the 800 level.

SILVER HILL.—The 260 level east crosscut, 790 feet from shaft, advanced 15 feet through hard porphyry; distance from shaft, 800 feet. The northeast crosscut, 430 feet from shaft, advanced 15 feet through porphyry and clay, with small seams of quartz; distance from shaft, 495 feet.

EAST SIERRA NEVADA.—On the 520 level the east crosscut from the south drift was advanced 42 feet, making its total length 298 feet; face continues in porphyry, showing streaks of quartz and clay with some water.

HALE & NORCROSS.—On the 300 level the east crosscut is advanced 230 feet; face in clay, porphyry and seams of quartz. The north upraise from the 1300 level is advanced 75 feet and continues in low-grade ore. The north drift started from the top of that upraise on the 1300 level was advanced 18 feet and connected with a south drift from the 1200 level ore stope. This connection greatly improves the ventilation of this part of the mine. Are still re-timbering the main incline at and below the 1300 level station; also the main shaft above the 1200

level. Are extracting ore from the 400, 500, 600, 700 and 1200 levels, and from the 1300 level upraise. During the week have milled 120 tons of ore, the average battery assay of which was \$19.89 per ton. Have bullion on hand and at the mill amounting to \$64,757.85.

WARD COMBINATION SHAFT.—East drift on the 1800 station is out 132 feet; face in porphyry. **JULIA CON.**—The northwest drift from the 1800 Ward station is out 150 feet; face in clay and porphyry.

ANDES.—Work has been resumed in this mine. **Cherry Creek District.**

MERRIMAC.—White Pine *News*, Jan. 1: The Merrimac Co. of Cherry creek seems to be in no end of financial trouble. Its creditors at home and abroad are clamoring for their dues. A Mr. Nelson went through here a few days ago and took Deputy Sheriff Simpson with him to attach the company's property at Cherry creek. We learn that the claim is about \$6000, held by San Francisco parties.

Eureka District.

ORE AND BULLION SHIPMENTS.—Eureka *Sentinel*, Jan. 4: During the month of December, 1889, there were shipped over the Eureka & Palisade railroad the following products from the mines and furnaces of this district: Sixty tons of Richmond lead, 180 tons of crude bullion, 534 tons of ore and 13 tons of scrap iron destined for Salt Lake and San Francisco. The ore shipments were small, as none has been hauled from the mines for two weeks past.

Jefferson District.

AT WORK.—Belmont *Courier*, Jan. 1: Work on the various mining claims in Jefferson district is prosecuted as usual. The Harrison Bros. are still encountering rich ore in their mine.

Philadelphia District.

WIDENING.—Belmont *Courier*, Jan. 1: The pay streak in the Laity mine in East Belmont is widening as the work of sinking progresses. This is proving one of the best properties in the district.

Pioche District.

RAYMOND SHAFT.—Record, Jan. 1: The main work going on at the Raymond shaft of the Pioche Con. Co.'s mines of late, viz.: that of opening up the Black Ledge winze, west of the shaft on the 12th level, was brought to a rather sudden stop Wednesday about noon, the immediate cause being a settling of the hill back of the hoisting works and directly behind the air-compressor, which forced the wall of the building against the fly-wheel of the machine and made a stop necessary to avoid serious damage. The winze at the time was clear for a depth of 187 feet. Sufficient warning was given to allow the pumps and air-pipe connections to be removed from the winze. Ordinarily an accident of this character would necessitate a stoppage of work for less than 24 hours, but occurring at this particular time it is not likely that work will be resumed for several weeks on account of the difficulty experienced in getting in wood. Thirty cords a day are needed, and in such weather as we have had for several weeks past it is practically impossible to get in any at all. The reserve wood has been consumed during the bad weather until on stopping work on Wednesday a supply for eight days only remained on hand. During the 24 hours preceding the accident seven feet was gained on the water, and this rate continued for a few days would have enabled the workmen to recover the pump submerged years ago on the 14th station.

Tuscarora District.

NEVADA QUEEN.—Times-Review, Jan. 6: Joint crosscut from 600-foot level of North Belle Isle has been advanced 34 feet, cutting seams of spar and must be very close to the vein.

BELLE ISLE.—West crosscut from the south drift, 250-foot level, extended 14 feet; rock hard, showing faces of ore.

NAVAJO.—A cleanup is being made at the mill, preparatory to closing down.

NORTH COMMONWEALTH.—3d level: Joint crosscut has been extended 11 feet, showing low-grade ore. East crosscut, from south drift, has been advanced 14 feet, all in vein formation showing some mineral.

GRAND PRIZE.—Face of north crosscut on the 500-foot level advanced 15 feet through more favorable ground.

NORTH BELLE ISLE.—Owing to the unprecedented weather, concentration has been temporarily suspended.

DEL MONTE.—No. 2 west crosscut, on 1st level, has been advanced 8 feet; work has been suspended at this point for the present, the miners having been put to work driving a drift north from joint crosscut; this drift is showing good ore. Joint crosscut east on 2d level has been advanced 12 feet; the rock is hard, but breaks well. On the 3d level joint crosscut continues to show low grade.

ARIZONA.

YAVAPAI.—Arizona *Journal-Miner*, Jan. 1: Parties are examining the Alligator mine in Crook canyon, with a view of purchasing. It is one of the best gold properties in Yavapai county. Ten bars of gold bullion from the Crowned King mine were shipped out by express yesterday. Street rumor has it that Phelps, Dodge & Co. have ordered a mill to arrive soon, to work the ore from the Senator mine. A deed has been filed for record from Dan O'Boyle and O. S. Morse to Wm. Smith, Jr., for six mines in Quartz mountain district. One-half interest in the Shannon mine, Humboldt district, has been sold to Peter Arnold for \$500. John Proutt has returned to Prescott, and will take charge as foreman of the Senator. The marble quarry near Mayer, owned by Geo. B. McCann and Joseph Mayer, has attracted considerable attention, and the prospects are good now for getting machinery to cut and polish the marble. Seven mills are engaged in crushing ore now in this county, and two smelters are also in full blast, with a prospect for the number being increased in the spring.

BRITISH COLUMBIA.

SMALLER CAMPS.—Kamloops *Sentinel*, Jan. 2: There are several mining camps throughout the interior which are not sufficiently developed to require an extended notice. At Cherry creek the Hidden Treasure Co. have accomplished nothing during the year. The McIntyre and Vernon claim has had some development work done, and a quartz-mill has been taken in this season and preparations made

ready for work next spring. The ore looks well, and everything is encouraging. At the Rock creek camp both hydraulic and quartz machinery have been taken in and considerable work has been done. At the Okanagan, much prospecting has been done, and one claim has been bonded to an American company for \$55,000. Great expectations are held out for next season. On Shuswap lake several good locations have been made, from which samples of ore have been taken assaying very high. Owing to lack of capital the claims are not thoroughly developed. The Allingham claim on the North Thompson has been further developed this season, a shaft being sunk 45 feet. The prospects are good for a paying mine. Other claims have been located in the vicinity of Mr. Allingham's. At Jamieson creek two locations have been made by Munn & Co., from the Toad mountain district. The prospects are very favorable and the claims will be further developed in the spring. One man is working in the claim during the winter. Some development work has been done this season on the coal seams near Kamloops. Not sufficient has been accomplished, however, to say whether the find will pay to work. Nothing has been done on the coal find on the North Thompson. On Siwash creek, near Vernon, considerable excitement was occasioned during the summer on account of the diggings found there. About 150 claims were recorded, and the creek was fairly well worked with varying results. There are three or four claims working all winter. Some of the claims paid \$3 a day per man, but this was exceptional, and it is said the camp did not pan out as well as was anticipated.

COLORADO.

IMPORTANT DEVELOPMENT.—Aspen *Times*, Jan. 2: Reports that come from the Mineral Farm are to the effect that the recently-discovered ore body continues to improve in appearance, and the management now feel convinced that they have a pay mine. It is not our purpose to discuss here the character of the developments, but simply to point out the important bearing that the opening of a bonanza mine at that point will have upon the future prosperity of Aspen. The discovery, if it proves to be a really good one, will be important for two reasons. The mine is at a point much farther north on the belt than any other pay mine and the discovery will prove the value of several thousand feet of the lode. While this may be a source of congratulation, there is another feature that will be of even more value to the district. The developments in the Mineral Farm have been upon an extended and expensive scale. It has not been one of those properties in which rich results have been attained with comparatively little exploration. Large sums of money have been expended and repeated disappointments have been met with, but the gentlemen who have been pushing the enterprise have never hesitated, and at last success appears to have been attained. We have always held that there was no section of 1500 feet of this contact that would not prove up rich if thoroughly prospected. Their success is a great card for Aspen, and the Mineral Farm can be pointed to as a signal illustration of the proof of the claim that it will pay to develop any property on the belt no matter what expense may be required to prove it up. It proves that this camp is not one of those where there is one small section rich, with miles of barren extension. It proves that the rich ore chutes lie along the lode at pretty regular intervals and that future exploration will continue to disclose their treasures until the developed series shall extend all the way to some point near Ashcroft on the south and perhaps to the boundary of the county on the north.

MINERAL OUTPUT.—Idaho Springs *News*, Jan. 2: The value of Colorado's mineral output for the year 1889 is estimated at \$30,000,000. During the month of December there were shipped from the station at this place 131 cars containing 3,684,000 pounds of ore, an excess of 979,450 pounds over the shipments for November. During the year 1889 Clear creek county shipped to the Omaha and Grant smelter 13,662 tons of ore carrying 3,732,178 pounds of lead, 1,091,203 ounces of silver, 12,436.73 ounces of gold valued at \$1,414,638.76. The ore shipped from this county to the above smelter had more value than that shipped by any other county in the State. The Champion mine during nine months ending Dec. 31, 1889, produced smelting ore and concentrates to the value of \$73,784.28. The ore is low grade, and it required a large quantity carefully and skillfully treated, to produce the above amount.

CRESTED BUTTE.—Elk Mountain *Pilot*, Jan. 2: We have been in the habit at the end of every year of publishing a detailed statement of the mineral output for the year, but the output is so painfully small the past year from the silver mines that we have very little to state. This state of affairs is no fault of the mines—no mines have played out, because they have not been worked to get played out. Such mines as the Sylvanite, Augusta, Daisy and the Ruby Chief group, which have always been depended upon to make an output, failed to ship anything at all. There was only about 300 tons shipped, the most of which comes from the Forest Queen and the Black Queen mines. We are promised better things for the coming year.

DAKOTA.

SEMI-MONTHLY CLEANUP.—Deadwood *Pioneer*, Jan. 3: Bullion from the Caledonia, Homestake and associated mines, representing cleanup for the last half of December, was brought down yesterday and deposited in Wells-Fargo's express office. It amounts to about \$170,000 and goes East to-day.

NO JUMPING YET.—No cases of mine jumping have yet been reported, but this does not necessarily argue that no mines have been jumped. Though assessment work was much more general last than for several years before, it is certain that a large number of claims were neglected and it is also quite probable that a goodly portion of these will be relocated.

BLACK HILLS BULLION.—The production of the Deadwood Terra Mining Co. for the first half of December was \$22,176 from 8846 tons of ore. The production of the Homestake Mining Co. for the first half of December was \$34,667 from 10,240 tons of ore. The company's credit balance increased from \$55,603 on Oct. 1st to \$50,396 on Nov. 1st.

IRON HILL.—The Iron Hill Co. has commenced shipping matte accumulated from recent runs by the smelter. The plant will blow in again for another

and continuous run some time during the present month. Ore from the company's recent purchase, the Calumet, will be put through. This purchase will prove a valuable one to Iron Hill stockholders. The ore is full of pyrites, a valuable factor in the process by which it is to be treated. A portion of the ore will go to the Galena smelter when it is started up, some time shortly after the Iron Hill plant blows in.

IDAHO.

YREKA DISTRICT.—Wardner *News*, Jan. 1: Among other promising claims in this district which have been patented during the year are the Idaho & Silver Casket lodes, the first westerly extensions of the Sierra Nevada. Over \$1000 have been expended in development of these claims this year, and in the near future they will be thoroughly and systematically developed. These prospective bonanzas are owned by R. E. Brown, J. G. Gable and C. F. Furbush.

LOWER CALIFORNIA.

AMONG THE MILLS.—Alamo *Nugget*, Dec. 28: Col. S. H. Lucas returned a few days ago in company with Messrs. L. P. Goldstone and W. S. Bell of San Francisco. The colonel is an indefatigable worker, and we are glad to learn that he is succeeding in putting the affairs of his company in such shape as to enable them to begin active operations at their stamp-mill in Mexican Gulch. The company has been reorganized under the name of the Liberty Mining and Milling Co., Messrs. Goldstone and Bell are well pleased with Alamo. The Huntington mill, belonging to the International Co., is at a standstill, but we believe it will start up again soon. The new amalgamator, Mr. Dobler of San Francisco, will arrive here soon, at which time the El Paso mill will resume operations. The Alamo mill is grinding away again at a good rate on custom rock. We congratulate Mr. Lane on his vigorous policy. This mill is now and has been a favorite with the camp. Since the new Gates rock-breaker has been added and the new pump and bed plates are in place, it is thought that even better results may be expected than the record of the mill has already shown. The Torres mill under efficient present management is doing good work and running quite steadily. Mr. Moore recently bought a large amount of ore from the Asbestos mine, which will produce an excellent cleanup.

MONTANA.

STRUCK IT RICH.—Three assays made by J. C. Pyle, the Granite assayer, for John Whiting, of samples from his recent strike in the Montana, Red Lion district, run as follows: No. 1, 112.40 ounces silver and \$2524 gold; No. 2, 110.6 ounces silver and \$968 gold; No. 3, 11.5 ounces silver and \$112 gold. Mr. Whiting now thinks himself a millionaire, and if the above result continues even one-tenth as good he will have millions. Mr. Whiting refused a bond on the property for \$20,000 the other day.

DUNKLEBERG DISTRICT.—Mining in the Dunkleberg district is keeping apace with other mineral sections in the State and at present is experiencing quite a boom. The Forest Rose, which is at present the most valuable mine in the district, is looking well. They are now shipping one carload of ore each day and have about 40 carloads on the dump ready for shipment with plenty more in sight in the mine. The Rose is likely to be one of the richest mines in Deer Lodge county. There is some talk of the Hatta starting up again, but it is doubtful if this will be done before spring opens up. Numerous prospects are being worked and all are looking extremely well. It is expected that with the opening of spring there will be quite a stir in the district.

UTAH.

CAMP CROSSCUTS.—Park *Record*, Jan. 4: The Crescent mill inaugurates shipments of first-class ore by means of sleds in a little while. Shipments of ore have been rather light again this week on account of the drifting snowstorms. Since the heavy snowstorm several miners have come down from the mountains and are engaged in working their Treasure hill and other properties near town. The road to the Anchor has been about as effectually blockaded as it is possible to be, and this has caused a delay in starting up the shaft-boring machinery, but it is believed that a good start will be made today. The shaft on the Silver King property, just above the Mayflower No. 7, is down about 100 feet and the calculation is to go down another 100 feet before drifting. The indications for ore are very favorable and it is possible that the shaft will open into ore at any time. Work continues at the Creole No. 2, though not on as large a scale since the leasers were notified by a representative of the Townsite Company that he claimed the ore for trespass and damages. More ore is being sacked up and it is still believed that the troubled well be amicably settled. The Nevada-Northland leasers have secured the services of Jas. T. Kessel as night foreman, and they are taking out ore with as much speed as possible and at the same time are opening new ground on the vein. The Nevada-Northland ore is very high-grade smelting and shipments to market will be gradually increased. Developments at the Woodside are of a very satisfactory nature and more ore is being taken out of the tunnel workings. The new strike is a big one. In running the south drift from the 200-foot level of the shaft a nice vein was struck a few days ago, and it is believed that it will open out into a big body of ore. Another important strike has been made in the Comstock mine. Only a few days ago the south crosscut, commencing from a point 750 feet in the tunnel, revealed a fine seam of ore which assays well in silver and lead. The crosscut is in about 40 feet and will be continued. Work will be kept up at the Comstock all winter and by spring everything will be in readiness to put up the big hoisting works and sink the shaft to a depth of 600 feet on the vein.

ORE AND BULLION SHIPMENTS.—The Ontario bullion shipment for the week was 38 bars, containing 23,051.25 fine ounces of silver. During the week the Mackintosh sampler received and forwarded 520,000 pounds of Ontario ore; 278,750 of Mayflower No. 7 leasers'; 89,150 of Woodside, including 24,830 of dump sortings, and 52,100 of Nevada-Northland leasers' ore; total, 940,000 pounds.

MECHANICAL PROGRESS.

Failure of Copper Steam Pipes.

Quite a discussion is going on in England over the frequent failures of copper steam pipes. The failure seems usually to take place at the seam where the pipe is brazed together, and quite naturally, since the pipe at this point is thinner than elsewhere and is composed of brass instead of copper, a metal of much less tensile strength. The trouble is that the most careful workmanship is needed to insure a good joint, and as surely as the brazing is imperfectly done, trouble will ensue.

The *Engineer* also propounds the hypothesis that a steam pipe is often subjected to much vibration and bending stress, which the brass at the joint will not endure, even when the brazing is thoroughly well done. In this way is explained the fact that pipes which have borne 300 pounds pressure under test have afterward burst open when working under half that pressure. Various remedies are proposed and tried for the trouble. In the Hamburg-American steamer *Columbia* the builders have wound the steam pipes with wire. Steel hooping and the use of seamless drawn copper tubes have been suggested, but for the large pipes the elbows must still be made of sheet metal.

The real remedy is very tentatively suggested by the *Engineer*, which says, mildly: "It may yet be found practicable to produce steel tubes deserving confidence." To an observer on this side the water it would seem that very ordinary steel pipe, such as may be bought for a fraction of the price of copper pipe, is deserving of a great deal more confidence than a pipe with a longitudinal seam whose strength is dependent on the success of the delicate metallurgical operation of brazing.

It may indeed be that it is not possible to use steel steam pipes in marine practice, but our cousins over the water were once sure that nothing but a copper fire-box would do for a locomotive until we, through our necessity, found out better. We are not inclined now, therefore, to take their assertion that it is necessary to make steam pipes of copper as settling the question.

Our contemporary, the *Engineer*, indeed says: "It is urged that steel tubes are liable to corrosion, and that scale is blown from them into the engines with bad results; also that they are not sufficiently flexible. Seeing that there are hundreds of miles of iron pipes in use on land, these objections are more imaginary than real; but perhaps the best pipe of all would be galvanized steel."

From the theoretical point of view, it would certainly seem that steel rather than copper is the proper metal for steam pipes. The boiler itself, which is subjected to the corrosion of the hot salt water, is made of steel; and since the steam pipe is subjected ordinarily only to the action of water condensed from the steam and practically free from saline matter, there seems little need of protecting the pipe from corrosion. In case the formation of scale proves an objection, it would seem an easy matter to prevent its reaching the cylinders by placing a separator next the engine.

We are not informed what practice American builders of marine engines are now following, but for our new naval vessels, at least, in whose success all are interested, it would certainly be best to refrain from following ancient practice in this matter, at least until careful tests have proved that mild steel is not a proper material for steam pipes.—*Engineering News*.

A Probable Famine in English Hematite Iron Ore.

The English correspondent of the *American Manufacturer* has for some time been asserting that there was a great possibility that a short supply of hematite iron ore would soon be encountered by English iron-masters. These prognostications are now fully considered as more than a matter of "probability." The *Manufacturer* says: The consumption of hematite ores by the furnaces on the west coast of England in the past few months has been on a scale much in excess of the production, and had it not been for the large stocks of ore that were held at various mines the production of pig iron would have been very much restricted, and both ore and pig iron reached a price that they have not yet attained. By the end of the year, however (which has now been reached), these surplus stocks will have been exhausted, and the makers of hematite iron on the west coast will have to depend, so far as relates to English ore, upon the output of the mines, which is insufficient to keep up the present rate of production.

In view of these facts vigorous efforts are being made to discover new deposits of ore. The west coast hematite ore region is being searched by owners of royalties with an energy that they have not displayed for many years; an energy that is being stimulated by the fact that these ores are worth from \$4.25 to \$4.50 net at the mine, and it is no wonder that prospecting is being pushed when such tempting prices are ruling. The average value of these ores in 1887 was but \$2.30 and in 1886 \$2.64.

The makers of hematite iron in England are not only searching their own country for increased supplies but are looking to foreign sources, in addition to the large amounts usually brought from Bilbao and elsewhere. Some

cargoes of ore from Carthagena have already been sent from the west coast and others are to follow.

Such a falling off of this most indispensable character of ore, in connection with the constantly increasing demand for the same, will no doubt soon result either in an active demand in England for American hematite ores, of which we have an abundance, or a call for American high-class iron in Europe.

HORSE NAILS BY THE BUSHEL.—We have already made notice of the invention of a machine for the manufacture of horse-nails. We give below from the Toronto, Canada, *Journal* an account of the working of such a machine in London: Some practical exhibitions of a novelty in the way of horse-nail-making machinery have recently been given in London, Eng. It is the invention of Mr. G. P. Capewell, and is an ingenious mechanical appliance for greatly increasing the rate of production. The entire process is automatic. A coil of wire is at the top, and one end being inserted the machine is set in motion, and in a very few seconds a constant stream of finished nails comes dropping out at the bottom. The following details of the work are, as stated, all carried out automatically: A short piece of wire is cut off and by a series of dies is drawn out to the required length; it is then beveled, pointed and headed. Each piece passes through a dozen operations consecutively, without the intervention of hand labor at any one of them. The machine is completely under control, and there is an arrangement by which it stops automatically if a nail fails to pass through any one of the operations. It is said that each machine will produce over 600 pounds of average-sized nails per day of ten hours. The nails produced were subjected to hydraulic tests, and the results are greatly in favor of the Capewell machine for producing strong nails of most perfect shape. There appears to be very little waste material, and we are told that this does not amount to 10 per cent. It is proposed to form a company to produce and work this machine in Great Britain.

A LAND-CLEARING MACHINE.—A Santa Rosa inventor has devised a machine for clearing land that is attracting attention. Concerning a recent trial on Guy Grosse's place in Rincon valley, the *Democrat* says: With its use stumps and trees which it would take an experienced and stalwart wood-chopper half a day to remove from the soil, are dragged out by the roots, scarcely the smallest fibrous vestige being left in the ground, in two and three minutes, and apparently without the expenditure of great force. The ease with which these stubborn impediments to agricultural development are removed is due to the mechanical construction of the machine, which is in the form of a capstan. Around the drum of the capstan a heavy cable winds, the other end being attached by means of a heavy chain to the stump or tree. This cable is 160 feet in length, and, by means of a patent block, any part of it can be hitched to the tree. The shaft which turns the drum is 15 feet in length and is drawn with ease by one horse. Dividing the length of the shaft by half the diameter of the drum—five inches—it gives the multiplying power of the machine as 36. By the means of another block, the power of the machine is increased to 72 times that of the horse which turns the shaft. The machine works on a hillside as well as on level ground, and two acres of land may be cleared without changing its position.

NICKEL STEEL is attracting the attention of metallurgists as the result of a paper read before the Iron and Steel Institute, in May last, by Mr. James Riley of Glasgow. It is claimed that tests made with an alloy of 95.3 per cent steel and 4.7 per cent nickel showed an increase in breaking stress from 30 to 40.6 tons per square inch, and the elastic limit was raised from 16 to 28 tons. The hardness can be increased 20 per cent. Steel rich in nickel is practically non-corrodible, 25 per cent of nickel increasing this quality in the proportion of 10 to 870. Some of the breaking strains are said to have reached 87 and even 95½ tons per square inch. The possibilities of this new alloy are among the nickel producers, and especially the Canadian Copper Co., which claims to have the best nickel mines outside of New Caledonia.

METALLIC RAILROAD TIES seem to be constantly but gradually working their way into general use. About 600 metallic ties have recently been laid on the track of the Chicago & Western railroad at Chicago. These are the first metallic ties that have been laid in the West. The tie is a metallic trough in which the rails rest upon a wooden block, thus avoiding metal contact, and are clamped firmly and securely in place without the use of fish-plates or angle-bars. The necessity for drilling the rails is thus obviated, and they are notched only when creeping plates are used under the joints. In riding over the tracks the change in passing from the wooden to metallic tie is said to be very noticeable in the greater smoothness.—*Trade and Traffic*.

GERMAN PATENTS.—During the recent discussion of the German Patent laws in the Reichstag, it was revealed that last year Germany granted only 321 patents, against England's 9779 and the United States' 20,420. While in most civilized countries the number of patents annually granted is increasing, or, at least, not decreasing, the number in Germany has fallen off 927 in the last five years.

SCIENTIFIC PROGRESS.

Phenomenal Gifts.

Peculiar gifts in relation to the power of the uneducated human mind in certain given directions are frequently brought to the knowledge of the world, and as yet without the remotest idea being suggested in regard to the laws or means by which these peculiar gifts are brought into power. The reader will readily call to mind Blind Tom, the pianist, and quite a number who have manifested this peculiar power in regard to figures. Indeed, music and mathematics seem to be the two directions in which these remarkable developments are generally made; although there are other directions in which they sometimes appear. The celebrated Sweet of New England is an example of this kind in surgery.

The latest novelty of this has appeared in the vicinity of Louisville, Ky., in the person of an uneducated negro. A late reference to this person is given by the Louisville *Commercial* as follows: Sam Sammers, the negro prodigy, was in town recently, and, as usual, entertained a large crowd, who were testing him with all kinds of mathematical problems. Sammers is a negro 34 years old, without the slightest education. He cannot read or write, and does not know one figure from another. He is a common farm hand, and to look at him and watch his actions he seems to be about half-witted, but his quick and invariably correct answer to any example in arithmetic, no matter how difficult, is simply wonderful. With the hundreds of tests that he has submitted to, not a single time has he failed to give the correct answer in every instance.

Some examples given him were as follows: How much gold can be bought for \$792 in greenbacks if gold is worth \$1.65? Multiply 597,312 by 13½. If a grain of wheat produces seven grains, and these be sown the second year, each yielding the same increase, how many bushels will be produced at this rate in 12 years, if 1000 grains make a pint? If the velocity of sound is 1142 feet per second, the pulsation of the heart 70 per minute, after seeing a flash of lightning there are 20 pulsations counted before you hear it thunder, what distance is the cloud from the earth, and what is the time after seeing the flash of lightning until you hear the thunder? A commission merchant receives 70 bags of wheat, each containing three bushels, three pecks and three quarts. How many bushels did he receive? And so on.

With Robinson's, Ruy's and other higher arithmetics before them, those who have tested him as yet have been unable to find any example that with a few moments' thought on his part he is not able to correctly answer.

Stanley's Geographical Discoveries.

It will probably turn out that Stanley's latest geographical discoveries in the equatorial regions of Africa have been of as much importance as those made by him on previous expeditions, or that have been made by any of the African explorers. There is more than a hint of the value of his recent discoveries in his announcement that the Victoria Nyanza is a much larger body of water than had heretofore been shown on any map. Stanley's discoveries add 1900 square miles to this lake; and what is of even greater importance, it is shown that it extends so far south that the actual distance between the Victoria Nyanza and Lake Tanganyika is only 155 miles, whereas the distance heretofore computed has not been less than 250 miles. These two lakes afford a length of navigable waters somewhat exceeding 500 miles. The other lakes, as they are figured by the best authorities, have navigable waters hardly less in extent. That is, there are about 1000 miles of navigable waters afforded by these great inland seas.

Now, the nearer they are to each other the better it will be for all the future interests of commerce. Of two of these great lakes, steamers have been plying for many years. The theory has long been a favorite one that all the navigable lakes of Equatorial Africa would finally be joined together by short lines of railroad, and that the lakes thus united would become a great commercial highway in Central Africa. These lakes have already become of new importance in that sense, by the organization of the Free State of Congo, which, while it nowhere borders on any of these waters, has an exterior boundary near enough to derive great benefit from the future development of commerce by means of this great chain of inland navigation.

OBSERVATIONS ON ECLIPSES OF THE SUN.—Professor David P. Todd of the late expedition to the west coast of Africa to observe the eclipse which took place Dec. 22d, says that the chief purpose of these observations is not to find the distance to the sun, as many suppose, but to find out with the highest degree of accuracy the position of the moon's diameter relative to that of the sun at several recorded instants of observation. The data so obtained bear directly upon the betterment of the numerical data from which the astronomer predicts the position of the moon and is a matter of serious moment in the future of the science of navigation and in further improvement of astronomical tables and theories of the motion of the moon. But in addition to this purpose, the last 20 years have seen a great development

of the science of solar physics, and observations of the solar corona, only seen at time of total eclipse, have much to do with this science. No one yet knows what this corona really is, and its study is depended upon to still further develop our present imperfect knowledge of the laws governing solar energy and the constitution of the sun itself. The importance of taking advantage of every solar eclipse can be appreciated when it is understood that in the last 100 years only a few hours over one day have been available for this purpose. Photography is the most powerful adjunct of the eclipse observer of to-day. These plates preserve the precise figure and relative brightness of the corona and all its streamers with the highest precision, and permit careful and leisurely study to supplant the hasty and imperfect observations of only a few years ago. Spectroscopic investigation is also added to photography.

A GLASS TELEPHONE.—Jerome Prince of Milford, Mass., while lately reflecting upon the varied musical sounds given out by glass tumbblers, when more or less partially filled with water and properly manipulated, conceived the idea that these vibrations might be brought to some practical utility in connection with the telephone. With this conception he immediately set to work to demonstrate his idea with the following result, as given by the Boston *Journal of Commerce*. "The new telephone" which he has constructed, "consists of a diaphragm or transmitter of simple glass, resting on a number of glass rods, and these communicating with an ordinary wire. The line in operation at Milford extends from a grocery on Main street to the residence of one of the proprietors, a distance perhaps of some 30 rods, passing some five or six sharp angles before reaching its destination. Over this wire the ticking of a watch can be distinctly heard, and a whispered conversation carried on with no difficulty whatever. The distance that sound can be transmitted with the new telephone varies according to the thickness of the glass transmitter. The one in consideration allows a whispered conversation three miles, and by using a thicker glass a much longer distance. It makes no difference how many angles the wire takes in reaching its destination, the sound is transmitted just as readily. Another peculiarity of the invention is the increased intensity of the sound that is transmitted. Each vibration seems to gather strength and force from the vibrations behind it, and when the sound reaches the ear of the auditor it is wonderfully clear and distinct."

THE WIND AT TOP OF THE EIFFEL TOWER.—Careful observations were made last summer to determine the difference in the velocity of the wind at 65 feet above the ground at the Eiffel tower and at the top, 995 feet above the ground. Up to the 1st of October last complete observations had been obtained for 101 days, and from these it appears that on an average the velocity of the wind is about 3.1 times as great at the more lofty station as it is at the lower. Moreover, the breeze at the top is always fairly strong, as during the whole of the summer months in which observations were taken, the average velocity of the breeze throughout any given day always exceeded 23 ft. per second, and during 21 per cent of the whole period of the observations this average daily velocity was upward of 33 ft. per second. No great storm seems to have occurred during the time over which the observations extend, and we do not know the maximum wind velocity registered during this time.

THE HEIGHT OF OCEAN WAVES has long been a source of much speculation among scientists and others. Various means have been adopted to reach accuracy, but hitherto with very little success. Perhaps the following may be considered as near perfection as any device hitherto employed. We copy from an exchange: "An interesting feat has just been accomplished by Hon. Ralph Abercromby, who has succeeded in measuring the height of ocean waves by floating a sensitive aneroid barometer on the surface, and in gauging their width and velocity by timing their passage with a chronograph. As a result of these experiments, he reports Admiral Fitzroy in the conclusion that waves occasionally reach an altitude of 60 feet. The highest wave measured by Mr. Abercromby was 46 feet high, 765 feet from crest to crest, and had a velocity of 47 miles per hour."

THE GULF STREAM.—It has been noticed for many years that the flow of the Gulf Stream appears to be approaching nearer and nearer to the Eastern coast of the Union. The question just now seems to have acquired a new interest, due to an article recently published in the Boston *Transcript*, by Lieut. Downes, U. S. N., wherein that gentleman states that this great ocean current is now flowing nearer to the New England shore than has probably ever been known before. This is in part at least owing to the weakness of the Arctic current, and its entire absence at times, in the North Atlantic. Lieut. Downes thinks this proximity of the warm Gulf Stream to our coast accounts for the comparatively mild, open winters of the past two years.

FORESTS AND THE RAINFALL.—A drought which has prevailed in South Africa is said to be due to the same cause that ruined Egypt, Mesopotamia and India, once the most fertile countries in the world. It is the destruction of the forests.

ELECTRICITY.

Electrical Progress.

A great advance in the application of electricity for the purpose of light and power during the present year will certainly exceed that of all previous time. A glance at the columns of any of the weekly electrical journals of any date during the past year will show that hundreds of arc and thousands of incandescent lamps, and miles of electric railway have been constructed for.

Electric motors, says *Stationary Engineer*, have been manufactured at a rate of upward of 250 per week, and their average rating will exceed 700 horse-power.

The series system of incandescent lighting, which gives cheap distribution over extended areas, and can be easily and cheaply extended at any time, is being adopted by villages, and is hailed as a blessing by the older people, whose eyesight is growing dim as age advances.

The incandescent lamp in the homes of people of very moderate circumstances is a fact of to-day, and the price at which it is furnished is found to be within their means. This is another triumph in the field of electric lighting, for the incandescent light can now be introduced into places where gas will never be able to compete. The flexibility and simplicity of the series incandescent system will make it the poor man's friend, for in any place where underground wiring is not compulsory, the incandescent lamp can be furnished at a less cost than would be charged for the same amount of light from gas. Electric railways are so rapidly multiplying in the United States, that reliable data is old and comparatively worthless by the time it is compiled.

Motors have been introduced for all conceivable purposes to which power can be applied, and small industries run by electrical power have started up in many places where steam-power could not have been utilized. Motors of all the different designs that have been proven of value find a ready sale, and the factories engaged in their manufacture are, in many cases, being enlarged. The storage battery is being extensively applied to the many purposes for which it is applicable.

FUSIBLE FIRE-PLUGS FOR ELECTRIC LIGHT WIRES.—Mayor Hart of Boston, who has been visiting a number of cities, studying their electric-light systems, was recently in Chicago. To a reporter he is stated to have said that he believed that the only means to guard against the danger to buildings from fire from the electric wires was by using fusible plugs, placed outside the building and protected from water. As to the usefulness of these appliances to a certain degree, there can be no question, but we hardly think Mayor Hart meant to be quoted as pronouncing them the only means of safety. That electric lighting will soon be made as safe from accident as illuminating gas hardly admits of a question. If our metropolitan Solone will use their endeavors to secure means of safety from electric fires as earnestly as they are now seeking to put a stop to one of the most important discoveries of the age, they will accomplish much more good. Electricity in all its phases has come to stay, and don't you forget it.

FROM MR. EDISON.—Mr. Edison recently said to an interviewer: "At the present time the phonograph is occupying my time. I have been improving it, and it is more perfect to-day than ever. In speaking into the phonograph it was soon found that the syllables were not recorded. For instance, if I were to say 'species' the 'sp' sound would be lost. Well, I have about solved the problem now, and the sound of 's' is inscribed with the other letters. I run the phonograph or graphophone in three ways—with a treading, a battery, or with the ordinary incandescent light by attaching the machine with a wire to the lamp. Business people can have their choice. I shouldn't want to be bothered with a treading, and I think the best plan is to use the electric light, since they are now so commonly distributed. The battery is made to last for a month, three months, or six months, without being renewed. Let every man take his choice. I am making the three kinds."

A NEW ELECTRIC LIGHT COMPANY.—Articles of incorporation have just been filed by the Central Electric Company with \$250,000 capital and \$6000 subscribed stock to construct and maintain electrical apparatus in the cities and towns of the Pacific Coast. Directors: C. F. Fargo, J. Redding, L. L. Baker, G. P. Adams and C. E. Wilson. A proposition is before the City Trustees of Sacramento for an electric light franchise—to introduce into that city a Westinghouse electric light plant, to light the streets of that city.

RUTHLESS DESTRUCTION.—It was recently reported that a gang of linemen was engaged in the ruthless destruction of telegraph and telephone lines in the city of Cleveland, O., and that they were encouraged in the nefarious work by an enraged populace, simply on account of the death of a horse.

TO INVESTIGATE THE ELECTRIC LIGHT.—Two gentlemen from the Celestial Kingdom named Wong and Fong were in New York recently,

for the purpose of making a study of what to them is a never-ceasing wonder, the electric light. They are said to represent a Chinese syndicate which has a ninety years' contract with the Imperial Government to furnish all the public buildings and offices with electric light. They will go from New York to Pittsburgh to continue their study of the subject.

WHY NOT REPUTATE STREET CARS AND ILLUMINATING GAS?—The records of deaths in the city of New York showed that there were killed by street-cars during the year 1888 no less than 64 persons, and by illuminating gas 23, making the number killed by the electric current (5) insignificant compared with the deaths of individuals from any of the other causes named.

SO IT IS SAID.—The operator of an electric car at Pittsburgh, Penn., reversed the current very suddenly, a few days ago, and the iron-work became so heavily charged that two passengers received severe shocks.

AN IMPORTANT INDUSTRY.—It is estimated that 250,000 persons in the United States are engaged in business depending solely on electricity.

ENGINEERING NOTES.

THE LAKE ERIE AND PITTSBURG SHIP CANAL. Preparations are being made for the preliminary survey of a feasible route for the projected ship canal between Pittsburgh and some port on Lake Erie, by which lake ores and other commodities can be taken without transshipment from the Northwest to the Smoky City. Much interest is felt in the project, which is certainly a most important one, and one, also, that will undoubtedly succeed. The iron manufacturers and iron ore and coal miners, especially, will encourage the enterprise. The questions by which its projectors are just now confronted are (1) Can it be done? (2) What will it cost? and (3) Who will pay for it? These problems will be considered in detail and at length by a State commission appointed by the Governor, and backed up by a legislative appropriation of \$10,000 for a preliminary examination. Three routes are proposed—one via the old Pennsylvania canal, which at present is popular; one will pass through a portion of Ohio, and the third is rather mysteriously, just now, kept in the background. One of the principal difficulties in the way will be the undermining or bridging of the numerous railroad tracks along any route which may be adopted. There will also be many railroad "kickers" to contend with among the companies which may be paralleled by the canal. The question of cost or difficulty of securing funds will not present any special trouble. The city of Pittsburgh would be immensely benefited by the work in getting cheap and needed ores from the Lake Superior and other regions in the Northwest. It is an enterprise of national importance and must soon be carried through.

THE WATER RAILWAY.—The scheme of a water railway to draw ore at a speed of 100 miles an hour, which attracted much attention at the late Paris Exposition, is to have another trial under the patronage of the London Metropolitan Railway Company. The location selected is near the city of London. The *London Spectator*, in alluding to the scheme, says: "We shall soon have an opportunity to try what, if accounts are true, must be the very poetry of motion. The carriages run on skates or slides, but between the slide and the rail is forced a film of water, which prevents all jolting, bumping and shaking, and, in fact, makes the carriages skim along as the heat does on the sea. Then, too, the pace is 100 miles an hour. If the new railway is really practicable for long distances, all England will be a suburb of London, and Surrey will be saved from becoming a chessboard, covered with what the auctioneers call 'villa residences' standing in their own three acres of park-like grounds. A hundred miles an hour would make Bath as accessible as Brighton, while Manchester would be reached in one hour and 50 minutes."

A MILK PIPE LINE is talked of for the supply of New York with its indispensable lacteal supply. A company has been formed with a capital of \$600,000 to start the enterprise. One of the projectors says: "The scheme presents many difficulties, such as the milk becoming sour or churned, but we can deliver it in a half-frozen condition if we want to, and prevent its souring or churning. We shall probably be able to send milk to New York from towns within 100 miles of the metropolis for one cent a gallon. The concern can be as easily controlled as a telegraph system. We shall be able to send milk to the city in one hour." The main difficulty will be in keeping the conduits in thorough sanitary condition.

PRESERVING THE SACRAMENTO RIVER.—In regard to the duty of the General Government to preserve navigable streams, an exchange very correctly says: "It is the first duty of the Government to keep navigable rivers in a navigable condition. Railroads can never supersede waterways. A single barge will carry as much food or material of war as a train of cars, and a single tug will haul a dozen snob barges."

GOOD HEALTH.

Poison in Pickles.

Dr. Jackson, a Pittsburgh physician, recently analyzed a number of samples of pickles and catsups. In almost all the matter he found more or less salicylic acid, used by the manufacturers to prevent fermentation. In two-thirds of the samples there appeared fungi or molds, which indicated that the tomatoes had begun to ferment and grow moldy before the salicylic acid was added. Arsenic was found in one sample and sulphuric acid in another. The coloring matters used were largely cochineal and aniline red. About one-third of the pickles analyzed contained impurities and adulterations. The matter was chiefly in the vinegar, and the former was in both vinegar and pickles.

Of the ten samples there was copper present in two, oil of vitriol in seven, lead in one, iron in two and zinc in one. This is certainly a bad showing. Out of all the adulterations used, cochineal is really the only harmless one. As for the lead, iron and zinc, it is assumed that their presence was accidental, as a result of the action of the acid on those metals with which they had come in contact.

Salicylic acid is a very common adulteration of foods and drinks; milkmen have used more or less of it, and it is said that it is a frequent ingredient of lager beer. In fact in almost everything in the line of foods which undergo fermentation, this acid has been used as a preservative. Manufacturers contend that it is harmless in the quantities in which they employ it. Could the consumption of the foods and drinks containing it be limited, this agent would not of course do much harm, but appetites cannot be anticipated. Many people crave acids, and some are very fond of catsup, and eat it freely with almost every kind of meat. Physicians give salicylic acid for acute rheumatism, but it cannot be continued long, for the reason that the stomach very quickly becomes irritated and intolerant of it. This acid is a poison and capable of producing death in large doses. Even if small doses are taken for a long time the nutrition of the indulger is so impaired that he loses flesh and strength. As to the effect of the mold found in the catsup on the system, it is only necessary, says Dr. Jackson, to state that a number of years ago an experiment found that when rabbits were fed on moldy bread their ears sloughed off, decalcifications made their appearance and finally death resulted. Diluted sulphuric acid is sometimes given as a medicine, but only that which has been prepared with exceeding care. In the acid generally used to adulterate vinegar there is very likely to be a trace, at least, of arsenic. As for copper, no one can justify its use in food.

Dr. Jackson gives the following wholesome advice to those who purchase catsup: "In the first place, avoid a highly colored article, for the chances are that much coloring matter has been added to disguise the color of half-ripened or rotten tomatoes. Again, do not buy a low-priced article. When you see an array of catsup bottles in a window, with a price-card on them showing that they are being sold at half-price, don't you buy that catsup; it is not fit to go into a human stomach."

The writer has known of a bargain-hunter who walked four square out of her way to get a catsup that was sold five cents cheaper than better grades. Examination showed that catsup to be filthy; it was a network of moldy fiber. Considering how long a bottle of catsup will last, five cents is a very small saving to the purchaser, yet that much difference in price means a great deal to the manufacturer, consequently he cannot afford to put as good tomatoes in it, nor make it up so carefully as the better quality, so that this grade contains most of the rotten tomatoes, the sweepings, etc., all colored up nice and red with roseaniline. Whose fault is it that this kind of preparation is on the market—the manufacturer's? Not exactly. It is the fault of the bargain-hunter, who wants to get something for nothing—the bargain-hunter who holds a 5 cent piece so close to her eye that she cannot see the dollar behind it.—*Boston Herald.*

FALLING FROM A HEIGHT.—It may mitigate the distress with which we hear of terrible falls to read the following from the *New York Medical Journal*: "A medical man, formerly a sailor, states that in his youth he fell from the top-gallant yard of a vessel, a distance of 120 feet. Sensation was entirely lost during his transit through the air. It returned slightly on entering the water, sufficiently to enable the lad to strike out (being a good swimmer) and seize a life buoy. The writer thinks death would have been painless had he fallen on some hard substance; but the assertion that persons die in the act of falling is, he thinks, evidently wrong."

COFFIN NAILS.—In some parts of the West cigarettes are quite commonly referred to as "coffin nails." This is by some considered unjust to coffin nails, which are, in their way, useful and even necessary articles.

NEAR-SIGHTEDNESS is over-running the French people as much as the Germans. Among the senior boys in the different French colleges more than 46 per cent are near-sighted.

USEFUL INFORMATION.

BRIQUETTE MAKING IN PENNSYLVANIA.—The Reading Coal Co. at Mahanoy City has adopted a system of briquette-making from coal-dust. This waste-saving process consists of the coal-dust being evenly distributed with one-tenth per cent of pitch. This, by an ingenious contrivance, is pressed into large cakes, steam being used to moisten the mass. So hard does it become that it possesses the same power of resistance as coal, or, in other words, 100 pounds of coal dust pressed will last as long as the same amount of hard coal. A pressure of 35 tons is brought to bear on each briquette. There are two presses in operation now, and when run to their full capacity will turn out about 800 tons of the briquettes in 24 hours. The briquettes take up 25 per cent less space than ordinary coal, and in consequence an engine can be loaded to go one-fourth farther without replenishing the supply of fuel.

THE WHALE.—Comparison with other living bodies must be made in order to form any adequate conception of the magnitude or weight of a whale, which is, by far, the largest specimen of a living thing on the earth. Nilsson remarks that the weight of the great Greenland or right whale is 100 tons, or 220,000 pounds, or 110 tons, equal to that of 88 elephants, or 440 bears. The whalebone in such a whale may be taken at 3360 pounds, and the oil at from 140 to 180 tons. The remains of the fossil whale, which have been found on the coast of Ystad, in the Baltic, and even far inland in Wangapause, Westergothland, betokens a whale which although not more than between 50 and 60 feet in length, must at least have had a body 27 times larger and heavier than that of the common or right whale.

TO LESSEN ACCIDENTS.—A very useful invention, tending to lessen the possibility of accidents in factories, is now being extensively adopted in England. The breaking of a glass, which is adjusted against the wall of every room in the mill, will at once stop the engine, an electric current being established between the room and the throttle-valve of the engine, shutting off the steam in an instant. By this means the engine was stopped at one of the mills recently in a few seconds, and a young girl, whose clothes had become entangled in an upright shaft, was released uninjured.

EARS AS CIGAR HOLDERS.—The women of Borneo, like the male smokers of Siam, use their ears as cigar-holders, but in quite a different way. Every Burmese girl prides herself on the size of the hole she can make in the lobe of her ears. Some of them reach the size of an ordinary napkin-ring. Into these they often place their cigars. The Burmese cigar is generally of a mammoth size—an inch or more in diameter and from six to eight inches long.

FIRST AMERICAN COAL TO BRAZIL.—The first cargo of the American bituminous coal that has been known to be shipped direct to Brazil was taken by the schooner Hannah McLoon, which recently sailed from Philadelphia for Santos. Many efforts have been made to introduce coal from this country into Brazil, but every attempt was opposed by a combination which refused to handle the American product.

TO TAKE OUT GREASE FROM MARBLE.—Apply a little pile of whiting or fuller's earth saturated with benzine, and allow it to stand some time; or apply a mixture of two parts washing soda, one part ground pumice-stone, and one part chalk, all first finely powdered and made into a paste with water; rub well over the marble, and finally wash off with soap and water.

HOME HAND-GRENADES.—Any one can make the hand-grenade fire extinguishers, and at a small fraction of the prices charged in the market. Any light quart-bottle will serve to hold the solution, which is composed of one pound of common salt, one-half pound of sal-ammoniac, dissolved in about two quarts of water.

TO BERLIN BY SEA.—Serious attention is now being paid in German official circles to a scheme for connecting the Baltic and Berlin by a sea-going ship canal. The question as to whether this could best be brought about by deepening the Elbe or the Oder is at present under the consideration of a committee.

A KNOT AND A MILE.—Comparatively few newspaper readers know, or have any special reason to know, that a knot is more than a mile, and that six of the former equal about seven of the latter. Accurately speaking, there are 6086.7 feet in a knot and 5280 feet in a mile.

JAPANESE CEMENT.—It is said that a stone has been discovered in Japan which has remarkable qualities as a cement material, and can be worked up for a much less price than the imported article costs. The cement will bear a weight of 400 to 500 pounds per square inch.

IMPORTED WEEDS.—Of the seven weeds which the "Weed law" of Wisconsin requires farmers, under penalty, to destroy, only one is a native of the United States, all the rest being naturalized importations from Europe, where they are common wild plants.



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W. B. EWER.

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Passing Events.

The unprecedented storms have soaked the ground so full that the quartz mines have more pumping to do than usual, and in some places heavy snows have impeded work by blocking up ditches and roads.

The railroads in the State have been having a hard time of it for some weeks. Floods in the south and heavy snows in the mountains have given the division superintendents plenty to do. Up at the Summit they have had 16 feet of snow on a level and the big rotary snowplows have been kept busy.

Since our last issue, the mining town of Wardner, in the Comor d'Alene region, Idaho, has experienced a disastrous fire; seven persons have been killed by a snowslide at Sierra City, and the hoisting works and shops of the Anchor mine, Utah, have been burned. The bodies of the men buried in the Utica mine cave have not yet been recovered, nor are they expected to be for some time.

Word has been received that the only successful one of the total-eclipse expeditions was that sent out from the Lick Observatory, California, through the liberality of Chas. F. Crocker, who paid all the expenses. The party met with clear skies for their observations, being more fortunate than the Government or private parties.

A vast deposit of sand was some time ago discovered in Placer county, which makes very valuable glass material. A company has been incorporated, with a capital of \$50,000, with the object of establishing a manufactory of glass in the county on a large scale.

The Silver Problem.

In last week's editorial under the caption "Windom's Silver Policy Defended" we should have entered more fully into the outside price to be paid by the Government in Treasury notes for silver hillion deposited in any one of the United States mints. The outside price to be paid is \$1 for 412.5 grains standard silver. Leading bankers in this city concur in the opinion that by standard silver the Secretary most unquestionably means the United States standard, 900 fine, which is one-tenth less than the highest commercial standard, 1000 fine, on which all quotations are based. This being the case, then, in 412½ grains of United States standard silver there are 371½ grains of silver of 1000 fine, so that the Government will pay \$1 for each and every 371½ grains of silver, 1000 fine, which is equivalent to over \$1.29 or par, for each and every ounce of 480 grains.

As we have before said, Secretary Windom's plan has several features that commend themselves, not the least of which is the making of the United States, and not European countries, the controller of silver; for any foreign government wishing silver hillion in this country must either enter the open market and bid up for it or else buy United States Treasury notes and ask for their payment in hillion at the market value of silver.

If Secretary Windom's compromise plan is liable to receive favorable action, himetallists should insist upon the placing of gold on the same footing as that of silver, for what is sauce for the goose is sauce for the gander.

Already several silver bills have been introduced in Congress; among them is that of Senator Bland, demanding free coinage. This is, by far, the better course to pursue, and which must, sooner or later, come, not only in this country but in all leading commercial countries. The large and constantly increasing growth of trade demands more money, either silver and gold or else paper currency, based on the two metals, which latter can be demanded and at once received on presentation of the paper representative.

No country can have too much money; history from time immemorial confirms this well-established fact, and therefore the United States should not be an exception, as it now is, for by a scarcity of money corners can be more successfully run by the unscrupulous.

In substantiation of the fact that no country can have too much money, we will give the statistics of the amount of money in circulation at latest date for which they are reported in the following countries:

Country.	Paper.	Gold.	Silver.
Germany.....	\$207,551,732	\$348,729,000	\$214,240,000
France.....	596,591,466	873,000,000	597,900,000
Great Britain.....	203,534,617	587,683,000	93,164,000
United States.....	918,581,833	375,917,715	110,485,452

In France it is ooduced by political economists that the masses are more prosperous than they are in any other civilized nation. This was fully attested by the alacrity with which the call for the German indemnity fund was responded to, as money came in quickly from all classes. Notwithstanding the heavy losses met through the Franco-German war, France's recuperative power was attested by its again soon taking the lead in general prosperity. No one has yet had the hardiness to assert that it was not to the large money currency of that country its prosperity has been and still is largely due. Although hi-metal, yet France holds nearly as much gold as both Germany and England combined, which should put to the blush those gold-hugs who fear dire disaster if we fully and unequivocally adopt hi-metallism.

John Jay Knox's plan to perpetuate the National Banks is hardly deserving notice. No paper currency should be issued except by the National Government, and not even by it unless redeemable at the will of the holder in either gold or silver, or both, if so desired. The National Banks were called into existence in perilous times, and have survived their usefulness. The National Bank notes now in circulation should be replaced by Treasury notes issued by the Government against silver.

The fire in the Anaconda at St. Lawrence mines, Montana, is practically out. The mines have been sealed since Nov. 23, but were opened this week. The shafts are full of gas and no one has gone down, but no signs of fire are apparent. They have been injecting steam into the mines ever since they were closed.

Standards of Measure and Weight.

The Prototype Recently Brought to the United States.

On the 2d of January, 1890, the sealed boxes containing the prototypes of the meter and the kilogramme were opened by the President of the United States, in the presence of several of the heads of the Departments and of scientific men, at the office of the United States Coast and Geodetic Survey. These standards are one set of "national prototypes," constructed under the direction of the "Bureau International des Poids et Mesures," at the Pavillon de Breteuil, near Paris.

This International Bureau was organized in 1875 upon the previous International Meter Commission of 1872. In 1875, 16 Governments, including the United States, formed the International Bureau, and later four other Governments joined—Great Britain as late as 1884. All the work and experiments were done at the cost of the Governments subscribing. The standards adopted by the high contracting powers were the "meter and kilogramme of the archives of France." The prototypes were to be made from an alloy of platinum 90 per cent, and iridium 10 per cent. The meter was to have a length of 102 centimeters, a cross-section nearly X, a weight of about seven pounds, and the gradations marking the meter near each end were to be traced on the neutral axis. Standard thermometers were to accompany each meter and each kilogramme.

The form of the kilogramme was to be a cylinder, whose height should equal the diameter, with the edges slightly rounded and the designation marked simply by a difference in the furnishing.

The accuracy of comparison of the meter was to be within one-tenth of a micron, or one two-hundred-and-fifty-thousandth of an inch; and the "tolerance" or difference of the prototype from the standard was fixed to be plus or minus less than five microns, or one five-thousandth of an inch, the quantity being known, of course, to the one-tenth of a micron.

The meter of the archives is an "end measure," and a "provisional standard," with gradations, had to be determined therefrom; the comparisons were made according to a method proposed by Fizeau. There were many difficulties to be overcome in this measurement. Finally the new provisional standard was accepted from which the lengths of all the other prototypes were determined.

These preliminary operations were carried on through 10 years, when a London firm, Johnson & Co., was selected to furnish the metals, which required 18 months of continued experiments and trials to produce in the required purity. The Messrs. Brunner of Paris constructed the meter bars, which were rolled by several operations into the required form. To the "Conservatoire des Arts et Metiers" was assigned the gradnation near the ends of each bar. Then the Director of the International Bureau made the final comparisons of all the different meters with the provisional standard and with each other, and from a mathematical dissection of the observations, derived the final difference between each and the provisional standard.

Among the different kilogrammes assayed to be standard it was finally agreed in 1882 that the kilogramme KIII in platinum iridium should be the international prototype, and the limit of "tolerance" was fixed at plus or minus 0.2 milligramme, and the comparisons are made to the one-tenth-thousandth part of a milligramme, and the final correction given to the one-thousandth part of a milligramme, or the one-sixty-seven-thousandth of a grain.

Many supplementary studies were necessary to know the character of the meters; their rates of expansion, their length between gradations when asported at different points, their possible change of character after long travel, etc. The whole subject of a standard thermometer was investigated and settled. It is reported that the length of the meter remains the same, whether the bar is supported at one point in the middle or at the two ends; and in the comparison of the kilogrammes it is said that two weights placed one above the other in vacuo differ from what they would if placed side by side, because the upper weight is farther from the center of the earth. If weighed in the air, the second disturbing element would be the

different density of the atmosphere in the place of the two weights.

The 31 prototype meters were distributed to the different Governments on the 28th of September, 1889, and on behalf of the United States, Hon. Whitelaw Reid, Minister to France, received two of three prototypes of the meter and one of the two prototypes of the kilogramme. These were, by direction of the Secretary of State, through instructions from the Superintendent of the United States Coast and Geodetic Survey, delivered to Prof. George Davidson of that service, who carried them from Paris to Washington, where they were delivered on the 27th of November to Prof. T. C. Mendenhall, the superintendent. The form of receiving, transmitting, opening and identification of these standards was based upon a similar proceeding when the standard English pound was delivered to the United States Mint at Philadelphia many years since. It was originally intended that Prof. Davidson should be present at the opening before the President of the United States, but his duties called him to this coast.

At the office of the United States Coast and Geodetic Survey in Washington comparisons will be made between the new standard meter and the one which has been heretofore the authority of the United States, and henceforward it will be the absolute standard of the United States. The kilogramme will, in like manner, be subject to comparisons with other weights, and their relation thereto will become known and the standard established therefrom. Primarily this will reach the coin weights of the United States, to which earnest and exhaustive experimentation will be given. These coin weights are made under the direction of the Superintendent of the United States Coast and Geodetic Survey.

Electrical Engineering.

It is noticeable just now when so much attention is being directed to experimenting with electric street railroads, that there is a great demand for "electric superintendents." A good many of the failures are attributed to incompetent superintendents. When the electricians turn the roads over to the companies, in what is supposed to be good running order, more or less difficulties are met. Then the ordinary street-car superintendent is at sea, and an ex-telegraph operator is not any better off.

Here is a field for young men who are willing and ready to study and prepare themselves for the work. Those who are expert in their work now have all they can do, and there is room for many others.

In fact, electric engineering is a coming profession. So much attention is now being paid to electric lighting, electric power, electric railroads, etc., and the field in all these branches is so constantly widening, that there are opportunities for the present and future for those with knowledge of electricity and its appliances. The young men who now take up the study of electricity as a profession will be in a few years those who will be in charge of large companies and work.

MINING STOCK ASSOCIATION.—At the annual meeting, held on last Wednesday, of the Mining Stock Association of this city, all the old officers were re-elected. At the meeting a resolution was introduced and unanimously adopted, instructing the president and secretary of the association to communicate with the Congressional delegation from the Pacific Coast, asking them to give their undivided attention in favor of the free coinage of silver.

NORTH BLOOMFIELD CONTEMPT CASE.—The old-time North Bloomfield Mining Co. case was up before Judge Sawyer once more the other day. This time the company's officers were cited to show why they should not be punished for contempt in hydraulicking in spite of the order of court. The matter was argued by Statesman Cross of Nevada City, and taken under advisement.

THERE has been some danger of a strike at the Union Iron Works because the managers desired the men to contribute 30 cents a month each so as to secure the services of a surgeon in case of accident. The men objected, and some of them refused to work, but the matter will possibly be settled without further trouble.

The Mining Belt of Peru.

NUMBER II.

The Basin of the Cerro.

The basin of the Cerro is formed by an irregular circle of hills surrounding it on all sides. It is composed of a series of small terraced plains and of a low central ridge, the site of the town and the larger part of the mines. The central ridge is the Cerro (hill) de Pasco. It is about one and one-half miles long by three-fourths of a mile wide. The town is laid out on its backbone and eastern slope, while its western slope is substantially occupied by a series of immense quarries or open cuts called *tajos* or *tajos abiertos*. Mines have been worked to a greater or less extent over all parts of the ridge, as well as on some of the hills bordering the basin. Many of the mine-openings are inside of yards in the town, some are in the streets, and the majority now worked are in or around the *tajos*. The altitude of the town is 14,193 feet above sea level.

The most striking feature of the place is formed by the huge *tajos* which line the western slope of the ridge and pass into and through the town limits, threatening its existence, as indicated by the ruined buildings around the edges of the pits. Huge cracks in the ground adjacent to these *tajos* are constantly opening and perhaps closing, but attract no notice from the residents, except in the case of the special family whose dwelling commences to fall.

The *tajos* were formed originally by the caving of the mines. During 250 years, since 1630, the miners have been burrowing like moles under the surface, driving here and there in a most unsystematic manner, crossing and recrossing the same ground, extracting the richer ore and dumping the poorer where most convenient, and afterward returning for this poorer ore; and all this time making no attempt to secure the ground except for the moment, or to provide for future operations. They have excavated huge chambers underground and left them to stand or fall as might chance. An untold number have fallen; some have stood and are still to be seen, 150 to 200 feet long, 50 to 75 feet wide, 15 to 25 feet high; and labyrinths of connecting passages and chambers exist, so intricate that, without a guide, one dare not penetrate far into them for fear of getting lost. When the Tajo Matagente first caved, 300 men underground are said to have perished.

A *tajo* once formed is constantly enlarged by subsequent caving, by falling of the sides and by quarrying of the walls. The superficial area of the *tajos* of Sta. Rosa and Tingo (which connect) is about 41 acres, of Tajo Matagente

ment of the upper zones, a result intensified by periodical saturation of the mass with water during the rainy seasons.

The climate of the Cerro is unusually wholesome for those having proper conveniences of life and plenty of warmth and ventilation, but disagreeable and trying to some constitutions; and I should advise against long-continued residence without occasional changes to warmer regions. But at distances of eight or ten miles from the Cerro in almost any direction, by de-

andesites, slates and sandstones and the argenterous formation. Fig. 3 shows their relative positions. Fig. 4 is a general section across the basin from east to west, so drawn as to include the main elements of the rock series. If the line of this section were traced on Fig. 3, it would run from Parajirca hill southwesterly to the center of Tajo Santa Rosa, and thence northwesterly to Pargas ridge.

[Unfortunately we have not space to give the details of Mr. Hodges' observations on the

Above the water level, the formation consists of a highly metamorphosed and greatly oxidized material, of constantly varying structure, color and composition. Over a large portion of the town-ridge there is a hard, compact, reddish or yellowish and very quartzose cap-rock of ever-changing thickness. Below this, as a rule, the formation is softer and more decomposed, being sometimes broken into loose or cemented fragments of all sizes, and passing by all gradations of structure and hardness, but without any evident regularity, into earthy masses or soft clays or sugary sands. The smaller fragments, whether loose or cemented, are often so arranged as to present a slate-like appearance. A hard gray quartzite is frequent; porous material resembling scoria is met now and then; and a rotten slate, generally pyritic, is not uncommon. Local evidences of stratification may be seen, but generally on a limited scale; and everything of this kind is irregular and indistinct.

The rock is everywhere very silicious, always yielded considerable percentage of slimes when crushed wet, and everywhere contains at least traces of silver, of pyrites and of carbonate of lead (and of lime). Very rarely is the silver visible, even with the aid of the magnifying glass, and then principally in small native scales in connection with quartzite.

It is noteworthy that the decomposition of the mineral constituents does not always proceed gradually from the present surface downward. Very hard and very soft rocks often adjoin, and large bodies of solid pyrites in a chalcidonic matrix are found at varying depths, and generally in close proximity to greatly oxidized material.

Gold occurs in the merest traces, and thallium has been detected in the ballion. The condition of the silver has not yet been satisfactorily determined. All direct tests for chlorine have given negative results. A part of the metal is unquestionably in a metallic state, as may be seen occasionally. Undoubtedly it exists in varying combinations in the different classes of ores. The sulphurets of copper, silver and iron are common to the formation above and below water level. Native copper occurs rarely; zinc is reported in all analyses, and galena at times rich in silver is found in bunches south of the large copper deposits.

Below the water level there is evidence sufficient to show that under the highly altered surface rock there are slates, sandstones and limestones, in strata which (according to Rivero), like everything east of the andesite, have a general northerly and southerly strike and an easterly dip, which contain quartz, calc-spar, pyrite and chalcopyrite very generally, and often in high percentages, and in which rich deposits of sulphurets and occasional native silver have been found in times past.

After a long study of the ground, I have been led to the conclusion that the surface rocks and the deep deposits are made up of essentially the same materials and differ chiefly in the degree and kind of metamorphism which they have undergone.

My impression is, that the site of the present Cerro was once covered with strata (more or less horizontal) of slates and sandstones, and, to a certain extent, limestones, which now form essentially what I call the argenterous formation; that these strata



TOPOGRAPHICAL AND GEOLOGICAL PLAN OF THE CERRO DE PASCO.

ascending the steep ravines, one can reach places where is a soft and pleasant climate, and where the vegetation is abundant and beautiful.

Physical Aspect.

Fig. 3 is a general topographical and geological plan of the basin of the Cerro. The whole region around the Cerro at first sight is apt to appear dispiriting. The trails are rough. Barren hills of limestone, slate and sandstone,

geology of the district, and must confine ourselves to a condensation of his remarks on the argenterous formation.—EDS. PRESS.]

The argenterous formation lies between the limestones on the east and the andesites on the west, and forms the central ridge on which the town is built. At the north it rapidly narrows, as shown on the plan, while at the south its boundary is undefined, there being no ex-



GENERAL SECTION ACROSS THE BASIN OF THE CERRO DE PASCO, PERU.

about nine acres, of those of Olayac about the same as the last.

It is impossible to determine, with any exactness, the amount of material removed. The present sides, sometimes formed by toppling crags, vary from a few feet to hundreds of feet in height. From the lowest point of Sta. Rosa tajo to the top of Sta. Catalina hill, which is moving into the tajo, is a measured vertical height of 329½ feet.

If, for the sake of a general estimate, we assume the average depth of the Sta. Rosa and Tingo *tajos* to be 100 feet over a superficial area of 1,800,000 square feet, we have 180,000,000 cubic feet, or somewhere near 9,000,000 tons, extracted at this locality alone, from vertical depths ranging up to 350 or perhaps 400 feet. The removal of any such amount has naturally resulted in constant caving and move-

often in strangely-contorted or sharply-tilted strata of Jurassic and Cretaceous age, rise abruptly on all sides. The pampas are rolling, generally covered with short green grass, and especially in the wet season, abounding in treacherous hogs. In the vicinity of the Cerro the numerous mining haciendas, sometimes perched in unexpected places, form quite a feature in the landscape. Wherever water to run stones can be obtained, even if the supply is only for a few months in the year, there the *ingenios* have been erected. The combined grinding capacity of all these haciendas is about 185,000 tons a year.

Geology.

The mining belt of Peru is made up of rocks of Jurassic and Cretaceous age. In and around the basin of the Cerro there are visible on the surface limestone conglomerates, limestones,

platory work here. The area developed may be roughly stated as about one and one-half miles from north to south by three-fourths of a mile from east to west. It is very fully exposed for a maximum depth of 300 feet by the mines and *tajos* along the backbone and western slope of the ridge. Elsewhere it is imperfectly open to inspection.

This formation has long been a geological puzzle. The present attempt at a partial solution of the problem differs from all preceding theories on the subject principally in the respect that it combines in one formation rocks which have heretofore been considered radically different. The dividing line between the surface deposits above water level and the "deep deposits" below water line may be taken roughly as occurring near the general level of the Quilacocha tunnel.

have been repeatedly tilted, the western portions being gradually raised until they came to or above the present surface line, and naturally are more broken and altered than the easterly parts which now occupy levels below them; that there have been various eruptions of andesites, which rocks are now visible on the west of the argenterous formation on both sides of San Andres pampa; that accompanying or following these eruptions, there have been ejected from below siliceous and metalliferous solutions which have attacked most strongly the more broken portions of the strata, impregnating them with silica and silver and other metals, and otherwise altering them, such metamorphism being reinforced by subsequent exposure to atmospheric influences and intensified by succeeding eruptions of the andesite; that the

limestones at the east were deposited before the time of the latest upheaval and impregnations which tilted and cracked them, and formed and filled with ore the veins now seen in them; and that the last period of the geological history was that of the final weakening and erosion which gave the surface rocks their present outlines and appearance, and of the deposition of the limestone conglomerate visible at the south and west.

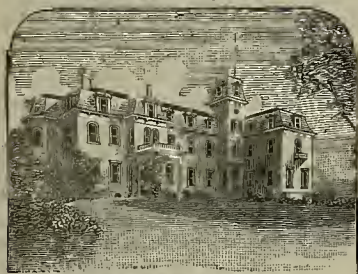
THE PAMICO-GARRISON DECISION.—In the final decree in this interesting mining case, Judge Rising said: "I see no reason to change the view I expressed on the last day of court in Hawthorne upon the rendition of the verdict, in substance, that the form of the decree under the findings of the jury will be that the apex of the east and west veins are within the surface boundary lines of the Pamlico location, and that these veins in their course downward cross the side line of the Pamlico and enter the Lakeview ground; and according to Act of Congress the plaintiff has the right to follow them where they go. As to the fourth issue, the jury has found that prior to and at the commencement of this action the defendants asserted an adverse claim to property of the plaintiff, and the plaintiff is therefore entitled to recover costs. So far as the third finding of the jury may be inconsistent with the first, second and seventh findings, I decide that the east vein and the vein exposed in the Eagle incline—at least at its intersection—are one and the same. This fact is uncontradicted by any evidence in the case, and the vein at the Eagle incline, therefore, is part of the Pamlico east vein. By the finding of the jury the defendants are entitled to the vein exposed at the Badger Hole, in the Bellview upraise, and extending from there and connecting with the Bellview tunnel, and at the Hartson tunnel, and has its apex in the Lakeview ground."

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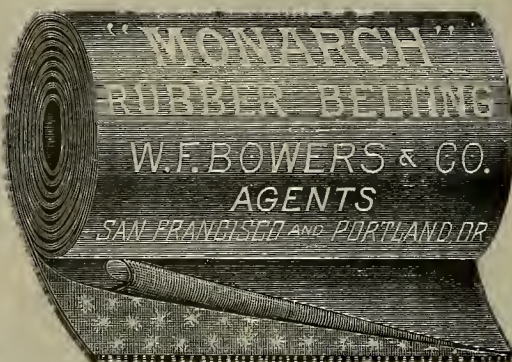


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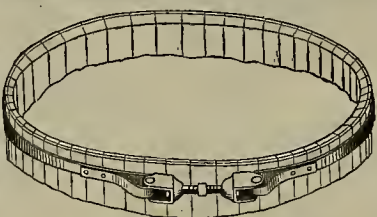


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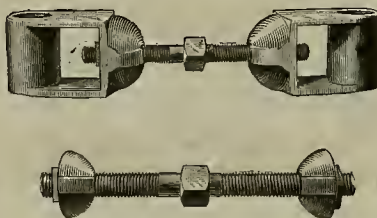
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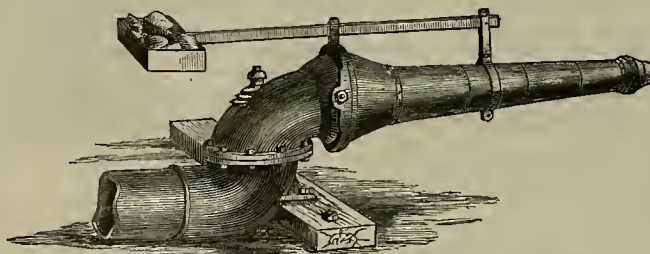
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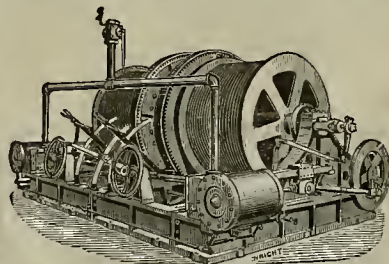
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Noticas of Recent Patents.

Among the patents recently obtained through Deway & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

HYDRANT COUPLING.—S. M. Hackley, S. F. No. 418,513. Dated Dec. 31, 1889. This is one of that class of couplings especially adapted for connecting the hose with the hydrant; and the object is to provide a coupling which can be readily and quickly manipulated, forming a water-tight joint. The invention consists in a two-part swinging or hinged coupling applied to the end of the hose and automatically tightening itself under the pressure of water on to the hydrant screw.

SECTION DREDGE.—John W. Brown, S. F., assignor to the Golden State and Miners' Iron Works. No. 418,496. Dated Dec. 31, 1889. This improvement in section dredges consists of an improved construction of what is termed the "ladder-joint," at which point the vertically movable section-pipe is connected with the stationary portion of the pipe which is fixed upon the scow. By the construction adopted the inventor greatly simplifies the joint connecting the movable and stationary sections of the section-pipe, and also the journals or trunnions about which the movable portions are raised or depressed.

SETTING SPUD AND CAOE FOR DREDGERS.—Alonzo P. Payson, S. F., assignor to the Golden State and Miners' Iron Works. No. 418,471. Dated Dec. 31, 1889. The invention relates to a device for moving and setting the scow upon which a dredging apparatus is carried, so that the scow may be advanced to a certain distance, which distance is equal to the amount of cut which can be excavated by the dredger. It consists of a supplemental spud moving vertically in guides upon a frame at one side of the dredger scow, guiding channels fixed to the side of the scow, so that the spud passes down through these channels, the length of these channels being equal to the distance which it is desired to advance the scow from time to time, and in connection with this a chain or rope passing around the pulleys and connecting the independent spud-frame with the gipsy by which power may be applied to haul the dredge forward the length of the guide-slot or channel.

PULVERIZER AND CONCENTRATOR.—Irwin W. Helwig, Pottstown, Pa., assignor of one-half to S. K. Soodgrass, Delaware, Ohio. No. 418,514. Dated Dec. 31, 1889. This is a device for pulverizing and concentrating gravel, earth, or other auriferous material, and is especially adapted for use in placer mines, where the earthy material needs to be broken and pulverized in order to separate the gold. It consists essentially of the combination with a pulverizer and its operating mechanism of a vibrating concentrator, having its bottom formed of wave-like surfaces and depressions, and having ledges overhanging the pockets, means for vibrating the concentrator and an inclined chute between the pulverizer and concentrator.

SHIRT.—Frank Batter of Slide, Humboldt county, assignor of one-third to P. C. Levar, Sonner, O. No. 418,639. Dated Dec. 31, 1889. Great discomfort is often caused to the wearers of shirts by reason of the pressure upon the outer end of the back collar-button which is transferred to the bones of the spinal column with greater or less severity. This invention is designed to do away with this difficulty by the use of the flexible tapes attached to the inner portion of the shirt-band, so as to pass through the button-holes of the band and be secured by a peculiarly constructed pin, which may, if desired, also pass through a button-hole in the center back portion of the tie, so as to hold that in place at the same time.

List of U. S. Patents for Pacific Coast Inventors.

The following brief list by telegraph, for Jan. 8, will appear more complete on receipt of mail advices:

California—Henry Anderson of San Francisco, metallic roofing; Henry Bryan of Modesto, shoe for thrashing machine; Robert E. Davis of San Diego, wave motor; Loyd C. Vibert of San Francisco, oat-huller; Patrick F. Duncan of San Francisco, discharge door for steam-lighters and retorts; Julius Finck of San Francisco, annunciator; John J. Griffith of San Bernardino, track gauge and folding bed-screen; John L. Hazlett of San Francisco, combined ruler and pencil sharpener; F. Littlepage of San Jose, well-boring apparatus; Bartlett McIntire of San Francisco, saw-etting machine; Leonidas C. Presley of Brooklyn, N. Y., and W. Lombard of Wheatland, Cal., check-cutter; Olaf Quist of Colton, life-preserver; A. Fred J. Salisbury of Eugene, wind-mill governors; Joseph Thompson of Decoto, knife-cleaner; Benjamin Walton of Compton, bird-trap; Peter Welandner of San Francisco, ventilator for boots or shoes.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, term of subscription, and give it their own patronage, and as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

On Wednesday five miners were buried by a cave in the Victor coal mines, near Trinidad, Colo.

Market-Place Scene in Nicaragua.

(Concluded from page 19)

There will be five entrances and the building will contain 50 rooms. In the center of the building, facing west, there will be a large lecture-room, provided with all the necessary tables and instruments used in demonstration, and capable of accommodating 200 persons.

Three rooms, each communicating with one another, and so arranged as to be made as one, will be provided for laboratory purposes. The dimensions of the rooms are as follows: 58 2x 32 9; 49 9x35.4; 34x38 4. In the old building accommodations were provided for only 60 students, whereas in the new one ample room is provided for 200 students.

The capacity of the institution will be more than trebled. A small lecture-room will be made for special purposes; also several rooms in which students can pursue their studies in special subjects, and other rooms for general use connected with the laboratories, such as storerooms, sitting-rooms, and rooms for study.

On the north side of the building a museum-room will be built. A wing, to extend from the north end of the structure, size 43 6x27.10, will be used as an organic laboratory and a combustion and store room, and in the center, about the center of which will be the complete building, there will be five rooms to be used as reading, sitting rooms, etc.

The present design calls for ample accommodations for 125 students, which is double the capacity as now provided in the south hall.

Academy of Sciences.

The annual meeting of the California Academy of Sciences was held on Monday evening last. The Committee on Election announced that Dr. H. W. Harkness had been elected president for the ensuing year by 89 votes out of 127 cast. The following other officers were elected: First Vice-President, H. H. Behr; second vice-president, Geo. Hewston; corresponding secretary, Frederick Gotzkow; recording secretary, J. R. Scowden; treasurer, I. E. Thayer; librarian, Prof. Carlos Troyer; director of museum, J. G. Cooper. Trustees—Chas. F. Crocker, D. E. Hayes, S. W. Holaday, Geo. C. Perkins, E. J. Molera, Irviog M. Scott, John Taylor.

The president read his report, which was a resume of the year's proceedings. According to it there are 257 members of the academy. Five died during the year and five were admitted.

Charles F. Crocker as chairman presented the report of the trustees. The board, immediately on its election last year, began work on the academy building, and at present nearly all contracts for construction are given out. The building, which is on Market street, near Fourth, will be ready for occupancy before the end of this year. A review of transactions with the Lick Trustees was also given. A note and mortgage for \$300,000 had been signed last September to the trust. Miss Flood had been paid \$4500 for interest in a division wall, and \$1200 has been received from the Crocker Scientific Investigation Fund, out of which \$960 had been paid. The Bank of California had been selected as custodian of the academy's money. Most careful and searching investigation had been made by the trustees regarding the new building, and the mode of construction adopted was considered most perfect. The total amount for contracts given out to date is \$218,346, which includes entire cost of building, except elevators and glass lights for sidewalk. Already \$117,045 of this amount has been paid, and there are ample funds on hand to defray the entire cost of building.

The treasurer in presenting his report said he did not segregate the various items so closely as in former years, owing to the building accounts being so large an addition. Last January there was a balance on hand of \$2936 06, of which \$2185 04 was from the general fund and \$751.02 from the Crocker fund. During the year dues received amounted to \$1151; interest from Crocker fund, \$1200; from general fund, \$1375; cash received from Lick trust, \$288 969.40; rent of fence at new building, \$425 Total receipts, \$293 210 40, which, with the balance, amounts to \$296,156 46. Disbursements were as follows: From Crocker fund \$960; general fund, \$270 029.93; sundry, \$1.95; total, \$270 991 88. Balance in Bank of California, January 1, 1890, \$25 164 58.

The recording secretary was absent, and his report was not submitted.

Prof. Carlos Troyer, librarian, announced that the library had received 2193 volumes.

The Director of the Museum was absent, and did not present a report.

The Curator of Birds and Mammals reported that the year had been satisfactory, although lack of funds was an obstacle in much work that might have been accomplished otherwise. A committee of three is investigating the food habits of California birds, particularly regarding their destruction of fruit trees, etc. The catalogue recently compiled and now in press is the first one on birds in Lower California. The possibility of establishing a zoological garden near the city is looked forward to with great interest by the Academy.

The Curator of Botany reported that 5164 species of herbs and plants had been presented to the Academy during the year and was a valuable collection.

Attention, Southern California Miners.

WORKS FOR SALE.
The Works are situated at Daggett, Cal., in the Calico Mining District, and on side-track of the Atlantic and Pacific Railroad. They contain a first-class 50-horse power Engine and 45-horse power boiler, with Ore Crusher and other machinery. Mill Scales, Assaying Outfit, etc., all nearly new. Also upon the premises an office building and a comfortable dwelling house (portable). The above can be had at a bargain. Apply to GILLISPY & CHILDS 123 California St., San Francisco.

DELINQUENT SALE NOTICE.

Booth Gold Mining Company. Location of principal place of business, San Francisco, California. Location of Works, Auburn, Placer Co., Cal. NOTICE.—There is delinquent upon the following described Stock, on account of Assessment (No. 4), levied on the 23d day of November 1889, the several amounts set opposite the names of the respective Shareholders, as follows:

NAMES.	No. Certificates.	No. Shares.	Am't
Richard Chenery, Trustee.....	160	6,275	\$125 50
Richard Chenery.....	17	5	10
C. A. les F. Eaton.....	171	300	6 00
Charles F. Eaton.....	172	300	6 00
Charles F. Eaton.....	173	60	1 20
R. N. Graves, Trustee.....	25	250	5 00
E. S. Harrison.....	177	1,000	20 00
Geo. R. Spinney, Trustee.....	82	312	6 24
Geo. R. Spinney, Trustee.....	176	500	10 00
E. P. Slosson, Trustee.....	181	500	10 00

And in accordance with law, and an order of the Board of Directors, made on the 23d day of November, 1889, so many shares of each parcel of such Stock as may be necessary, will be sold at public Auction, at the salesroom of Middleton & Sharon, No. 22 Montgomery street, San Francisco, California, on MONDAY, THE TWENTY-ETH (20th) DAY OF JANUARY, 1890, at the hour of 3 o'clock P. M., of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of the sale. GEO. R. SPINNEY, Secretary. Office, 310 Pine St., Room 25, San Francisco, California.

DIVIDEND NOTICE.

The German Savings and Loan Society.
526 California Street.

For the half-year ending Dec. 31, 1889, a dividend has been declared at the rate of five and forty-hundredths (5 40-100) per cent per annum on Term Deposits, and four and one-half (4 1/2) per cent per annum on Ordinary Deposits. Payable on and after Thursday, Jan. 2, 1890. GEO. TOURNY, Secretary.

BUTTE, MONTANA,

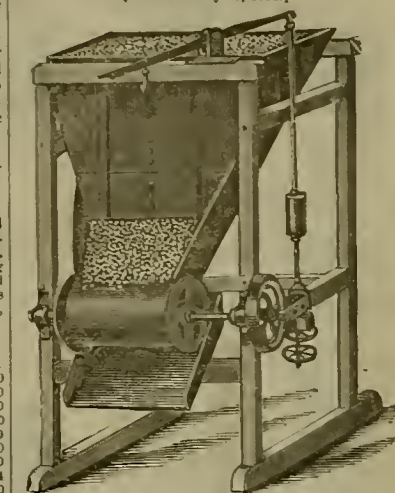
The railroad, mining and commercial center of the new State, offers some of the best inducements for investments in

Real Estate, Mines & Mining Stock

of any locality in the Northwest. For particulars address The Evans-Terry-Clausen Brokerage Co., 41 E. Broadway, Butte, Montana.

THE ROLLER ORE FEEDER

[Patented May 23, 1892.]



This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.

In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar for repairs.

Golden State and Miners' Iron Works,
Sole Manufacturers,
227 First Street, San Francisco, Cal.

HORACE D. RANLETT,

Ores, Mining, and Commission,
420 Montgomery St., S. F.

Ships under advances to smelting works in Boston, New York, Baltimore and Liverpool. Twenty-one years' experience in Shipping Ores and Managing Mines.

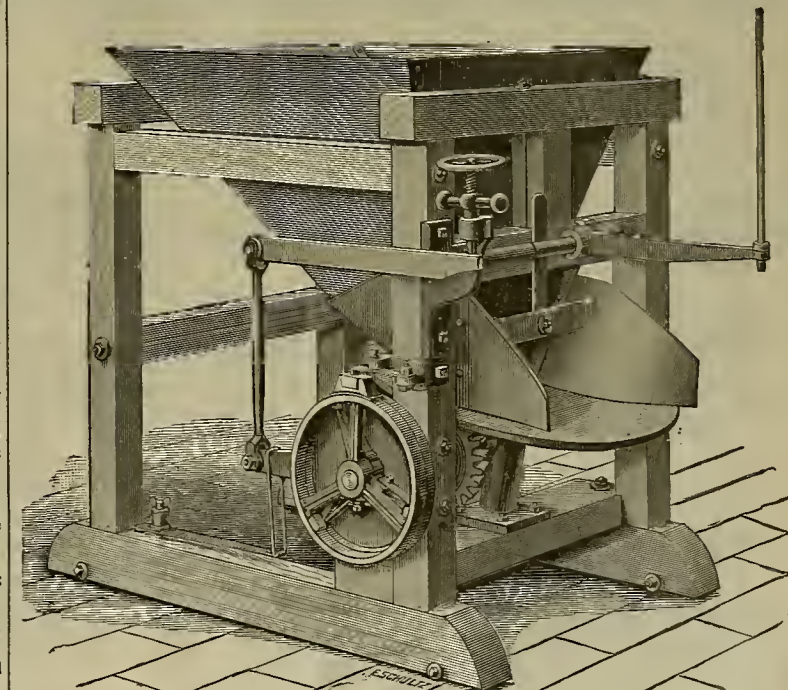
Solicits Consignments of Copper Produce and Management of Mining Matters. All business conducted on Cash Basis. Purchase and shipment of Mining Supplies a SPECIALTY. Sales of Developed Copper Mines undertaken. Business Manager of UNION COPPER MINE, Copperopolis, Cal.; NEWTON COPPER MINE, Amador Co., Cal.

FOR SALE.

One Ohmen's 12x12 Automatic Engine; best style in use. Also, 1 Boiler 45 in. x 16 ft. Both nearly new. Apply to W. W. QUICK, 221 First St., (Top Floor) San Francisco, Cal.

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Nos. 39 to 51 FREMONT STREET, SAN FRANCISCO, CAL.



"HENDY" IMPROVED "CHALLENGE" ORE FEEDER.

The best form of Feeder ever devised, and pronounced by reputable mining men to be far superior to any form of "Roller" Feeder manufactured. We refer to the following gentlemen who have furnished us with testimonial letters to the above effect, which can be seen at our office, viz.:

N. W. CROCKER, Supt. Bunker Hill Gold Mining Co., Amador City, Cal.
D. C. WICKHAM, Taylor Mine, Greenwood, Cal.
J. R. TROLOAN, Supt. South Spring Hill Gold Mining Co., Amador City, Cal.
W. G. ROBERTS, Greenwood, El Dorado Co., Cal.

WE ARE MANUFACTURERS OF THE

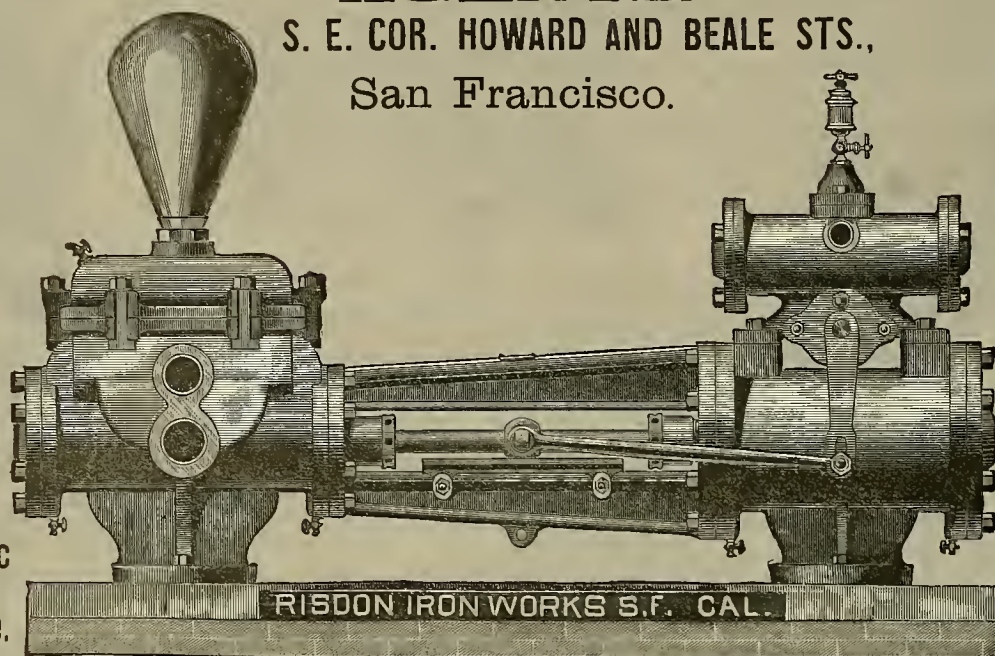
"CHALLENGE," "STANFORD," "TULLOCK," & "ROLLER" FEEDERS,
And will furnish descriptive Catalogues and quote prices upon application.

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AGENTS.

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Sugar House Pumps,
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Well Pumps.

Boiler-Feed Pumps,
Tank Pumps,
Marine Pumps,
Wrecking Pumps,
Fire Pumps,
Brewery Pumps,
Mining Pumps,
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Pumps,
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—AND—
Heavy Pressure Valve.

The Only Steam Pump Made that can be run at High Piston Speed without Shock and with Safety to the Machine. Piston Rods, Stuffing-Boxes, Valve Seats, Stems and Linings of Water Cylinders are of Best Composition Metal, U. S. Standard.
EVERY PUMP THOROUGHLY TESTED BEFORE LEAVING FACTORY.

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MINING MACHINERY

Stamp Batteries, Pans and Settlers,
"Dodge," and Improved Blake, Rock-Breakers,
"Dodge" Pulverizers, Slime Machines, etc.

AERIAL WIRE ROPEWAYS.

(VULCAN PATENT SYSTEM.)

The cheapest and most reliable form of Transportation of Ore, Coal, etc. Saves four-fifths of the cost by any other method.

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REFRIGERATING
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STEAM ENGINES

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Meyer Cut-off,
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REPAIR WORK SOLICITED.

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WATER POWER TRANSMITTED BY ELECTRICITY

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AMALGAMATING MACHINES. CASTINGS AND FORGINGS Of Every Description

ALL WORK TESTED AND GUARANTEED.

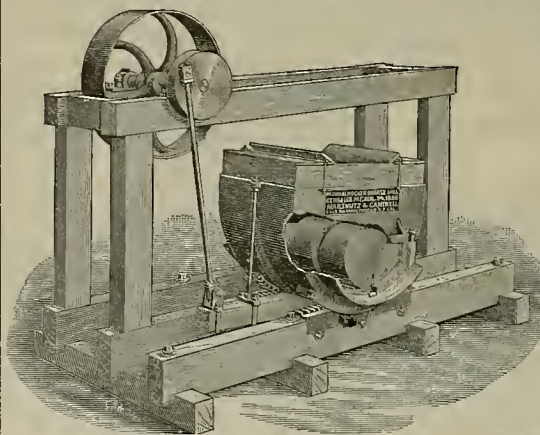
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CAPACITY. 12 Tons in 24 Hours. 3 H. P.

MARSHUTZ & CANTRELL, Sole Manufacturers.

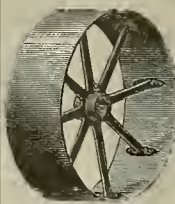


The Patentes and Manufacturers cordially invite miners to critically examine and pass judgment upon this improved system of milling and amalgamating ores in the following particulars:

1. The cost is less than one-half of stamps of same capacity.
2. The freight to mine is less than one-half of stamps.
3. The cost of erecting is less than one-fourth of stamps.
4. The power to drive it is less than one-half of stamps.
5. The wear is less than one-quarter of stamps.
6. There is no wear except on shoes and dies.
7. In point of amalgamation it is superior to any other machine in use.
8. In its simplicity of construction, We challenge competition with Stamps, Ball Pulverizers or and other ore crushing machines now before the public.

Send for Circulars and Price List.

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PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

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Sole Licensed Manufacturers of the

MEDART PATENT WROUGHT RIM PULLEY

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

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AMALGAMATING MACHINERY.

Stamp Mills for Wet or Dry Crushing.
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Cylinders. Amalgamating Pans, Settlers,
Agitators and Concentrators. Retorts, Bul-
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CONCENTRATING MACHINERY.

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Sectional Machinery
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Pumping Engines
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Pumping Machinery,

IMPROVED
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Blast Furnaces for
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SLAG CARS AND POTS,

Roots & Baker
Pressure Blowers,

SUSPENDED
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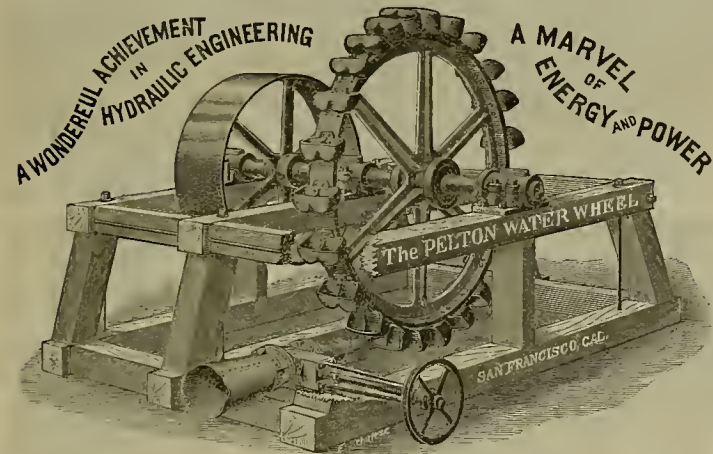
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THE PELTON WATER WHEEL

GIVES THE HIGHEST EFFICIENCY OF ANY WHEEL IN THE WORLD.



OVER 800 ALREADY IN USE.

Affords the Most Simple and Reliable Power for all
Mining and Manufacturing Machinery.
Adapted to heads running from 20 up to 2,000 feet.
From 12 to 20 per cent better results guaranteed than
can be produced from any other Wheel in the Country.

ELECTRIC TRANSMISSION.

Power from these Wheels can be transmitted long
distances with small loss, and is now extensively used in
all parts of the country for generating both power and
light.

APPLICATIONS

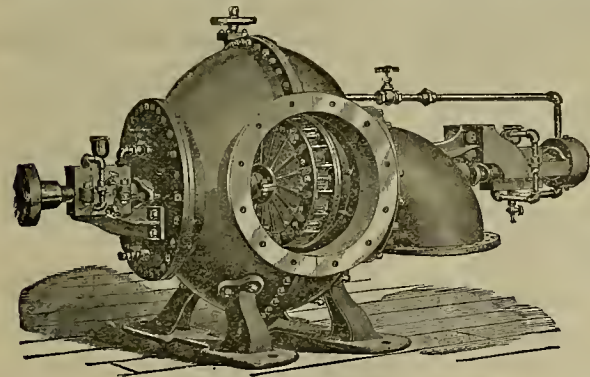
Should state amount, and head of water, power required,
and for what purpose; with approximate length of pipe;
also, whether the application is with reference to *Wheels*
or *Motors* described below. SEND FOR CIRCULARS.

The Pelton Water Wheel Co.

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PELTON WATER MOTORS.

Varying from the fraction of 1 up to 15 and 20-horse power. Unequaled for all light-running machinery. Warranted to develop a given
amount of power with one-half the water required by any other. SEND FOR MOTOR CIRCULAR. ADDRESS AS ABOVE.



JAMES LEFFEL'S Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and
high heads are utilized, and are guaranteed to give more power with less water than
any other wheel made. Being placed on horizontal shaft, the power is transmitted
direct to shafting by belts, dispensing with gearing.
Estimates furnished on application for wheels specially built and adapted in
capacity to suit any particular case.
Further information can be obtained of this form of construction, as well as the
ordinary Vertical Turbines for Wooden Penstocks and in Iron Oble Cases, free of cost,
by applying to the manufacturers.

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Successors to CHAS. CALLAHAN

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CAST and WROUGHT IRON SCRAP
SECOND-HAND BOILERS
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Of every description.

The Highest Price paid for all kinds of Metals.

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Extensive. For particulars (Principal only) address,

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COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed
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Metallurgy and Ores.

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GOLD AND SILVER REFINERY
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Highest Prices Paid for Gold, Silver and
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Standard Shot-Gun Cartridges,
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ALSO CHEMICALS, AND PHYSICAL, SCHOOL AND
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to our full stock of Balances, Furnaces, Muffles, Cruci-
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Chemicals.

Having been engaged in furnishing these supplies since
the first discovery of mines on the Pacific Coast, we feel
confident from our experience we can well suit the de-
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New Illustrated Catalogue, with prices, will be sent on
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Our Gold and Silver Tables, showing the value per
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Denniston's Silver Plated Amalgam Plates. The
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Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the
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BATTERY SCREENS.

Best and Cheapest in America.

No imitation, no deception, no planished or rotten
iron used. Only genuine Russia iron in Quartz Screens.

Planished iron screens at nearly half my former rate.

I have a large supply of Battery Screens on hand
suitable for the Huntington and all Stamp Mills, which I
will sell at 20 per cent discount.



PERFORATED SHEET METAL

For Flour and Rice Mills, Grain Separators, Revolving
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St., Chicago. Agent for the Pacific Coast—
Joseph E. Dorsey, 529 Commercial St., S. F.

MARKET REPORTS.

Local Markets.

SAN FRANCISCO, Jan. 9, 1890.

General trade continues quiet, yet the trade is more hopeful than for years, particularly since the cold weather set in, which has frozen the snow, causing it to become more compact, and gives more assurance of a long summer supply of water. The money market is beginning to work easier, which will be more pronounced when the large sums paid in for taxes are put in circulation. The East reports an easier tendency. This is reflected in the strength of sterling exchange. The latter is in demand for remitting interest and dividends abroad. An Eastern authority on the disbursements of money for the payment of interest and dividends in this month presents a compilation of figures, showing that the interest payments for 1889 by railways and cognate corporations will amount to \$238,370,242, against \$210,289,281 in 1888, an increase of \$27,080,961, while the dividend payments will foot up to \$102,091,089, against \$106,341,399 in 1888, a decrease of \$4,250,310, leaving the total disbursements for interest and dividends at \$340,461,331, compared with \$316,730,680 in 1888, a net gain of \$23,730,651.

MEXICAN DOLLARS—The market, although still inactive, shows a slightly better inquiry. The market held steady at 75¢, but at the close shows more strength with an advancing tendency. **SILVER**—Purchases the past week were made by the Government at 96 cents up to and including Tuesday. Exporters were irregular, bidding all the way from 95¢ to 95.85¢. The close money market is said to have been against a more active inquiry. The strong and higher rates for sterling exchange is in favor of a better export movement, which, combined with an easier money market, ought to bring about still higher prices. The Carson mint continues to use the silver output of the Comstock mines. We still adhere to the opinion that the work now being prosecuted on the Comstock is to open up the Red lode, which is nearly all gold. How long it will take to run into this lode it is hard to say, also its extent and richness. There is nothing so uncertain as mining, owing to the difficulty of seeing what is ahead.

To-day's (Thursday's) telegrams quoted silver in London at 44½d, and in New York at 96½c, with both markets strong. In our market a sale is reported to have been made yesterday at 95.55 cts. One bank quotes 96½ cts. as bid to-day, but sellers name 97 cts., with nothing doing.

QUICKSILVER—Receipts the past week aggregate 66 flasks. The demand is slow, but the market has a strong tone.

BORAX—The market is reported quiet but steady. At the East the demand is slower, but the market is strong.

LIME—Receipts the past week aggregate only 606 bbls. With clear weather an increasing call is reported.

LEAD—A better tone is reported at the East, with which our market naturally sympathizes. There is a prevailing opinion that the market will do better. European advices report a strong market.

TIN—Imports the past week aggregate 25,029 boxes of plate. For spot the market continues easy, but for forward shipment prices are too high to lead to business. Late cable advices report the market weaker, due to realizing sales. The statistical position is in holders' favor.

COPPER—The market steadily advanced up to yesterday, when it shaded some. The weaker tone is not accepted as a bad omen, but, on the contrary, as a more favorable sign. There have been free sales, yet the market at the East and abroad has taken all and at improved prices. The visible stock the world over is largely reduced under an enlarged consumption. The movement so far has been entirely free from speculation.

IRON—Imports the past week aggregate 200 tons pig from Hull and 135 tons from Irondale. In the local market the demand is still slow, but now that the tight money market is tided over, an improved call is expected to set in. The markets at the East and abroad are reported by telegraph to be very strong under a continued good demand. The consumption in England is reported to have been phenomenally large in 1889, while the exports also show a marked gain. In the United States the consumption was also very large, considerably in excess of 1888.

COAL—Imports the past week were as follows: From Hull, 501 tons; Seattle, 2595; Newcastle, N. S. W., 7815; Nantaimo, 1070; Coos Bay, 450; Departure Bay, 2350; Philadelphia, 302; total, 15,093 tons. The local market is reported more active, owing to cold weather, for house coal, and clear weather for steam coal. The large output of coal collieries is a controlling factor against an advance in prices, as is the advanced winter in deterring dealers from carrying liberal stocks. A spot cargo of Australian is said to have been placed at a concession. For near-by cargoes the market is hard to quote, owing to dealers preferring to wait arrival. For prompt shipment it is difficult to get a correct idea, owing to dealers and large consumers appearing off-b. In Australian charters there is nothing new to report during the week.

Eastern Metal Markets.

By Telegraph.

NEW YORK, Jan. 9, 1890.—The following are the closing prices the past week:

Silver in Silver	London.	New York.	Copper.	Lead.	Tin.
Thursday....	43	94½	\$14 25	\$3 90	\$21 00
Friday.....	44½	95½	14 25	3 90	21 20
Saturday....	44½	95½	14 45	3 90	21 20
Sunday.....	44½	95½	14 60	3 90	21 10
Tuesday....	44½	95½	14 60	3 90	20 90
Wednesday..	44 5-10	96½	14 45	3 95	20 80

NEW YORK, Jan. 8.—California refined borax steady, 8½¢. Quicksilver strong, in sympathy with London cable, 68¢. Copper supported, sales 100,000 lbs. Lake Ingot, 14½¢; Arizona, 13½¢ to 13¾¢; casting, 13¢. Pig lead, \$3.87½ to \$3.92; single car lots, \$3.95 February; \$3.97½ March; \$4 May.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, January 9, 1890.

ANTIMONY—	25	@	74
BORAX—Refined, in carload lots	7	@	—
Powdered	7	@	—
Concentrated	62	@	—
All grades jobbing at an advance.			
COPPER—			
Best	21	@	22
Sheet	22	@	24
Ingot, jobbing	17	@	18
do, wholesale	15	@	16
Fire Box Sheets	22	@	24
LEAD—Pig	4	@	4½
Sheet	7	@	—
Sheet	7	@	—
Pipe	6	@	—
Shot, discount 10% on 500 bags	Drop	@	—
Huck, # bag	165	@	—
Chilled, do	185	@	—
STEEL—English, lb.	16	@	20
Canion tool	9	@	9
Best Diamond tool	8	@	9
Pick and Hammer	8	@	10
Machinery	4	@	6
Toe Calk	4	@	6
TINPLATE—B. V. steel grade, 14x20, P. S.	5	@	50
do, V. steel grade, 14x20, spot	4	@	50
do, 14x20	6	@	70
do, roofing, 14x20	6	@	00
do, do, 20x28	12	@	00
Pig tin, spot, # lb.	13	@	618
do, do, to load	19	@	00
QUICKSILVER—By the flask	47	@	50
Flasks, new	—	@	—
Flasks, old	35	@	—
CHROME IRON ORE	10	@	62
IRON—Bar, base	3	@	31
Norway, base	42	@	64
IRON—Glenasmock ton	35	@	00
Edginton ton	35	@	00
American Soft, No. 1, ton	—	@	235
Oregon Pig, ton	—	@	35
Puget Sound	35	@	00
Old Lake White	27	@	60
Shot, No. 1, lb.	35	@	00
Bar Iron (base price) # lb.	—	@	—
Langdon	35	@	00
Thornlife	35	@	00
Gartsherrie	35	@	00

Coal.

TO LOAD.			
	Per	Ton.	Per Ton.
Australian.....	7 50	@ 7 75	Cardiff..... 9 50@10 00
Liverpool Stm.....	8 60	@	Lehigh Lump..... 16 50@17 00
West Hartley.....	8 50	@ 9 00	Cumberland bk 16 00@16 50
Scotch Splint.....	9 00	@ 9 00	Egg, hard..... 15 60@16 00
SPOT FROM YARD.			
Wellington.....	\$ 9 00		Seattle..... 7 00
Scotch Splint.....	9 00		Coos Bay..... 6 00
Greta.....	9 00		Canal..... 12 00
Westminster Brynbo.....	9 00		Egg, hard..... 18 00
Nantaimo.....	9 00		Cumberland, in sacks 19 00
Sydney.....	8 00		do, bulk..... 18 00
Gilman.....	7 00		

The Mining Companies' Financial Standing.

The following is the financial standing on the first Monday of the present month of the mining companies listed on the two exchanges in this city:

	Cash.	Debt.
Alta	\$43,188	
Alpha	9,087	
Andes	12,753	
Bodie Con.	\$21,236	
Benton Con.	91,000	
Belcher	8,849	
Belle Isle	5,267	
Best & Belcher	1,089	
Bulwer	16,740	
Bullion	\$9,864	
Challenge Con.	801	
Caledonia	82,237	
Chollar	448,633	
Con. Cal. & Virginia	176,392	
Confidence	1,630	
Con. Imperial	8,788	
Con. New York	6,890	
Commonwealth	61,604	
Crocker	17,113	
Crown Point	14,371	
Del Monte	6,810	
East Sierra Nevada	6,9 8	
Ex hequer	829	
Gould & Curry	16,560	
Grand prize	47,707	
Hale & Norcross	13,155	
Holmes	658	
Ind-pendence	416	
Julia	8,074	
Justice	19,912	
Lucky	492	
Ledy Washington	19,690	
Locomotive	1,842	
North Sella lode	32,876	
North Commonwealth	16,643	
Mexican	13,340	
Mono	18,204	
Navajo	176	
Nevada Queen	3,266	
Ocidental	130,440	
Ophir	8,435	
Oversman	16,338	
Pearl	8,073	
Peerless	6,335	
Potosi	14,764	
Savage	19,455	
Scorpion	7,680	
Seg. Belcher & Mides	16,445	
Silver Hill	14,616	
Sierra Nevada	31,379	
Stadard	3,573	
St. Louis	113,519	
Syndicate	7,817	
Union Con.	10,061	
Utah	14,912	
Weldon	4,017	

*With proceeds of the sale of concentrates at Salt Lake to be received.

†Unsold bullion to hear from.

‡Unsold bullion \$129,574 and further shipments to bear from, with \$54,000 in dividends and mine expenses about \$43,900 to come out.

§With more assessments to be collected.

||With an offset of \$19,000 in bullion and another shipment to hear from, out of which mine's December expenses (about \$12,500) have to come.

¶With monthly expenses to come out.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Justice, Jan. 7, \$7291; Crown Point, 7, \$955; Occidental Con., 7, \$14,272; Hanauer, 7, \$2050; Navajo, 7, \$13,500; Hanauer, 3, \$6900; Con. California and Virginia, 7, \$44,870; Hanauer, 5, \$4007; Savage, 9, \$29,978; Con. Cal. and Virginia, 4, \$90,000.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	AM'T. LEVIED.	DELIN'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Adelaide Copper M Co	Nevada, 11.	1. Dec 31.	Jan 31.	Feb 28.	W H Graves, 428 Sansome St
Belle Isle M Co	Nevada, 13.	15. Dec	4. Jan 8.	Jan 30.	J W Pew, 310 Pine St
Best & Belcher M Co	Nevada, 13.	15. Dec	4. Jan 8.	Jan 30.	J W Pew, 310 Pine St
Bullion M Co	Nevada, 13.	25. Dec	4. Jan 8.	Jan 30.	R R Grayson, 327 Pine St
Bodie Con M Co	California, 11.	25. Nov	1. Dec 1.	Jan 22.	E L Burling, 309 Montgomery St
Booth G M Co	California, 11.	2. Dec	20. Dec 23.	Jan 20.	Geo R Spitzer, 414 California St
Camp Creek M & M Co	California, 11.	2. Dec	30. Feb 12.	Mar 10.	A S Folger, 213 Fremont St
Con Imperial M Co	Nevada, 22.	5. Nov	22. Dec 27.	Jan 13.	G L McCoy, 329 Pine St
Con New York M Co	Nevada, 22.	15. Dec	11. Jan 15.	Feb 5.	C E Elliott, 309 Montgomery St
Calaveras Blue Gravel Co.	California, 4.	3. Nov	15. Dec 23.	Jan 14.	B Burdick, 240 Montgomery St
Eschbacher M Co	Nevada, 23.	25. Dec	16. Jan 21.	Feb 11.	O E Elliott, 309 Montgomery St
Golden Giant M Co	California, 23.	4. Dec	17. Jan 23.	Feb 12.	H T Briggs, Downville
Grand Prize M Co	Nevada, 23.	30. Nov	21. Dec 24.	Jan 15.	R R Grayson, 329 Pine St
Kentuck M Co	Nevada, 23.	30. Dec	11. Jan 14.	Feb 4.	J W Pew, 310 Pine St
Maydower Gravel M Co	California, 45.	50. Dec	27. Feb 3.	Feb 25.	J Moritz, 328 Montgomery St
Mexican M Co	Nevada, 39.	25. Dec	21. Jan 27.	Feb 18.	O E Elliott, 309 Montgomery St
Mono G M Co	California, 29.	25. Nov	18. Dec 23.	Jan 24.	B L Burling, 309 Montgomery St
North Occidental G & S M Co	Nevada, 1.	7. Dec	2. Jan 6.	Jan 27.	W H Watson, 302 California St
Natoma Water & M Co	California, 2.	5. Nov	21. Jan 28.	Feb 25.	P W Ames, 616 California St
Overman S M Co	Nevada, 61.	23. Dec	31. Feb 5.	Feb 25.	J D Edwards, 310 Pine St
Palisade M Co	Nevada, 2.	5. Nov	1. Dec 26.	Jan 30.	D Duck, 309 Montgomery St
Savage M Co	Nevada, 74.	50. Nov	5. Dec 10.	Dec 30.	E B Holmes, 309 Montgomery St
Seg Belcher & Mides M Co	Nevada, 5.	25. Jan	4. Feb 6.	Feb 25.	E B Holmes, 309 Montgomery St
Summit G M Co	California, 11.	5. Nov	14. Dec 14.	Jan 14.	B L Burling, 309 Montgomery St
Trinity River Tunnel & M Co	California, 5.	50. Nov	27. Jan 6.	Jan 28.	L H Pockman, 28 California St
Tetrahoff M Co	California, 3.	1. Dec	14. Jan 21.	Feb 14.	W J Garrett, 308 Pine St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING DATE
Bald Mt Extension M Co	California, J W Orear.		Downville.	Annual Jan 23
Iowa M Co	Nevada, C B Higgins.		208 California.	Annual Jan 14
Platt & Gilson M Co	California, C Hermann.		326 Kearny St.	Annual Jan 14
Sierra Nevada M Co	Nevada, E L Barker.		522 Montgomery St.	Annual Jan 15
Con St. George	California, T Wexel.		522 Montgomery St.	Annual Jan 15
Sprug Valley M & Irrigation Co.	Cal., W E Davis.		402 Front St.	Annual Jan 20
Silver King M Co	Arizona, A Waterman.		309 Montgomery St.	Annual Jan 14
Utah Con M Co	Nevada, A H Fish.		309 Montgomery St.	Annual Jan 29
Superior M & M Co	California, J M Burdick.		402 California St.	Annual Jan 14
Lone Star Quartz & Gravel M Co	Cal., A W Blundell.		2314 Sacramento St.	Annual Jan 14
Nevada Salt & Borax Co	Nevada, H C Van Wyck.		310 Pine St.	Annual Jan 21

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Champion M Co	Nevada, T Wexel.		522 Montgomery St.	10.	Nov 25
Caledonia M Co	Nevada, A S Cheminant.		328 Montgomery St.	08.	Aug 5
Con California & V M Co	Nevada, A W Havens.		309 Montgomery St.	50.	Jan 10
Derbec Blue Gravel M Co	California, T Wexel.		522 Montgomery St.	50.	Dec 23
Idaho M Co	California, J D Edwards.		Grass Valley.	50.	Nov 7
Mt Diablo M Co	Nevada, R Heath.		319 Pine St.	30.	Oct 23
Pacific Borax Salt & Soda Co.	California, A H Clough.		230 Montgomery St.	1 00.	Jan 10

Mining Share Market.

The market for the Comstocks has, the past week, been more or less dull, with the tendency to lower figures. The prevailing opinion is that they will go slightly lower before there is much of a turn, and to help them down one or two more assessments are to be levied. In the outside stocks, the Tuscaroras have shown an undue degree of activity under the leadership of Commonwealth. Usually well-informed parties look with confidence to those stocks being still more active, with the movement based on merit in several of the mines. As the stocks of several of them are well concentrated, quite a successful deal can be made before the spring months are over. They will probably soon begin to pull bullion by telegraph. In the Bodies and Quijotas there is nothing doing. There are points out for still lower prices for the Bodies. So far the low price points have always come.

From the Comstock mines the official news is of a more encouraging character. The letters received yesterday (Wednesday) report that in Hale and Norcross, on the 1250-foot north drift, running toward Savage, they were in nine feet of good ore—car samples assaying \$35 a ton. This find is quite important. In Crown Point there is an improvement in the 300 south stope. The ore assays for the week show an increase of nearly \$3 a ton. In Con. Imperial in West Crosscut No. 2 on the 300-foot level there is a decided improvement.

In Alpha they are sinking on the ore found in the east crosscut 60 feet north of the shaft. On the 600-foot north lateral drift they are in low-grade ore. The work in Ophir and also in Con. Virginia is being closely watched, and as for that, all the work going on in the different mines is receiving special attention from mining men. The grade of ore begins to show a higher value. In this connection it is well for the association that is so bravely battling to reform the abuses of the Comstocks not to forget that they have an able coadjutor in the person of Hon. Francis G. Newlands, for he has succeeded in reducing the milling charges of some of the mills from \$7.50 to \$5 a ton. Not only has he done this, but he has increased the assay value of Yellow Jacket ore from \$7.50 to \$25 a ton. From the outside mines there is nothing new to report outside of the published official letters, which are of a glowing character from the Tuscaroras, good from the Quijotas and prospecting from the Bodies.

Now that money is getting easy, and John W. Mackay is expected to return soon, the chronic bulls on the Comstocks look for an improvement in the mining share market.

The bullion output of Crown Point in last month was \$38,616, and that of Con. Virginia \$263,760. Chollar's, Savage and Hale and Norcross outputs were not filed up to this (Thursday) morning.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, department 10, San Francisco:

NORTHWESTERN G. & S. M. Co., Jan 4th. Location, British Columbia. Capital stock, \$1,000,000. Directors—H. P. Bowie, William Harney, W. W. Williams, Charles H. Plum, Jr., Edward Connelley, T. B. Berry and James D. Ruggles.

BEHRING SEA PACKING CO., Jan. 4th. Object, fishing, trading and mining. Capital stock, \$100,000. Directors—James Eva, James Madison, H. J. Bartling, Charles Lundberry and Chas. A. Johnson.

PACIFIC OCEAN BATHING CO., Jan. 4th. Object, to establish salt-water baths in this city. Capital stock, \$300,000. Directors—William Greer Harrison, E. A. Rix, W. T. V. Schenck, J. D. Sullivan and A. S. Murray.

ALASKA M. & M. Co., Jan. 8th. Location, Alaska. Capital stock, \$10,000,000. Directors—Thomas Brown, J. J. Jarboe, A. C. Corbier, G. A. Taylor and E. F. Stone.

BENICIA BRICK CO., Jan. 8th. Capital stock, \$100,000. Directors—G. F. and E. J. Duffey, J. E. Borland, A. S. Cheesbro, and John Boland.

CALIFORNIA LUSTRAL CO. (Oakland), Jan 8th. Object, a general mining and manufacturing business. Directors—S. S. Steel, Samuel F. Burbank, William F. Burbank, J. W. Dutton, Rufus B. Myers, Leighton W. Carson and Luke Doe.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

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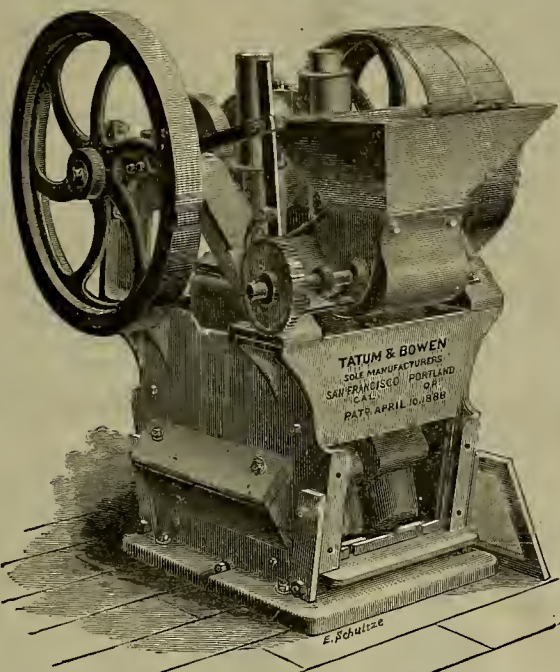
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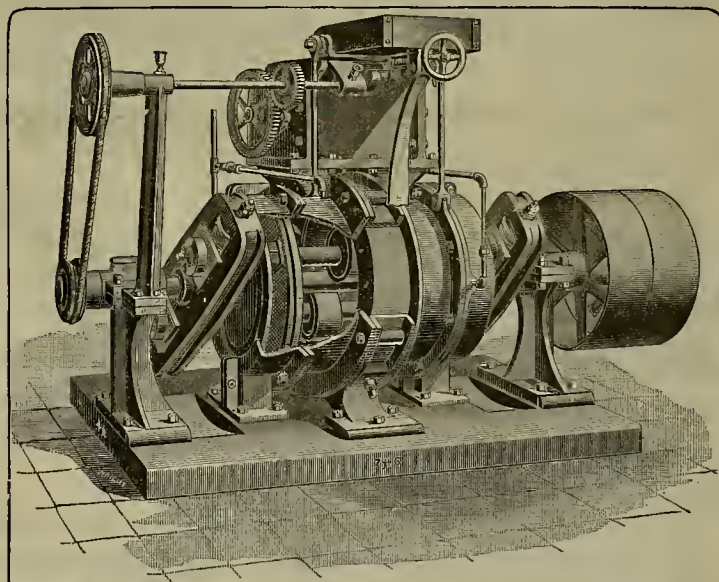
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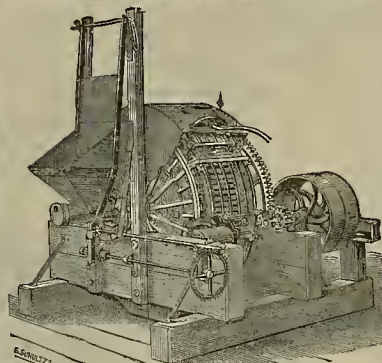
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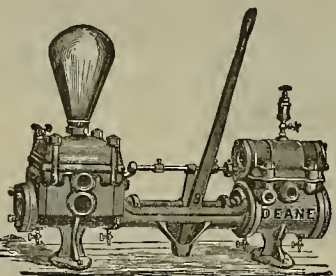
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A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

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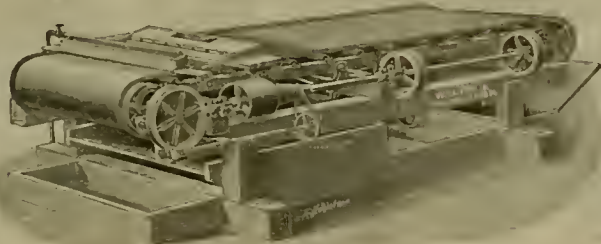
IMPROVED BELT FRUE ORE CONCENTRATOR.

The Best Ore Concentrator in the market, having double the Capacity and doing its work as close as the plain Belt machine, while its concentrations are clean. It is used in a number of Mills, the most notable of which is the Alaska M. & M. Co's Mill, where 24 Improved Belt Frues are taking the Pulp from 120 Stamps, crushing 350 tons per day, and is giving entire satisfaction as against 48 plain Belt Machines, taking the Pulp from the other 120 Stamps.

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Price of Plain Belt Frue Vanner, \$575, f. o. b.

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ADAMS & CARTER, Agents FRUE VANNING MACHINE CO., Room 15, No. 132 Market Street, San Francisco, Cal.



Protected by Patents December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883; July 24, 1888. Patents applied for.

There are Over 2200 Plain Belt Machines now in Use.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.
DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly, THE MONTANA COMPANY (Limited).

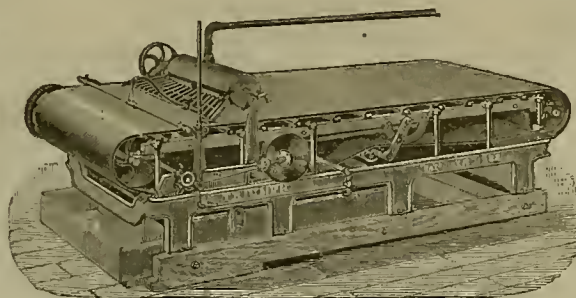
N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

"TRIUMPH" ORE CONCENTRATOR WITH IMPROVED RIFFLED BELT.

The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frue" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frue" Vanner is the best ore concentrator in the market. The fact that the "Frues" have improved (corrugated) belts does not militate against the superiority of the "Triumphs;" for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.

Price "Triumph" Concentrators, with Improved (Patented) Belt . . . \$650 f. o. b.
Price "Triumph" Concentrators, with Plain Belt . . . \$550 f. o. b.

We are prepared to guarantee the superiority of the "Triumph" over the "Frue" or any other form of Concentrator, for coin if need be. Circulars and testimonial letters furnished on application.



JOSHUA HENDY MACHINE WORKS,
39 to 51 Fremont Street, San Francisco, Cal.

(PATENTED.)
Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

Original Empire Mill and Mining Company,
Principal Office, 401 California St., cor. Sansome, S. F.
Location of Works, Grass Valley, Nevada Co., Cal.
GRASS VALLEY, NEVADA CO., CAL., Nov. 10, 1885.
Joshua Hendy Machine Works, 39 to 51 Fremont St., S. F., Cal.:

GENTLEMEN—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.

At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrators is the equal, if not superior to any other style of Vanner or concentrating devices. DAVID McKAY, JR.,
(Signed) Sup't North Star and Original Empire Mining Co.

N. B. When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.



THE GATES CRUSHER

Is beyond all question the most important improvement that has ever been made in this class of mining machinery. It will do more than twice the work with a given amount of wear than any other Crusher made, besides crushing so much finer that for mining uses, the capacity of the mill is greatly increased. It has the same relative superiority for macadamizing purposes, affording the cheapest and most reliable machine for this use.

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THAN ANY OTHER WHEEL
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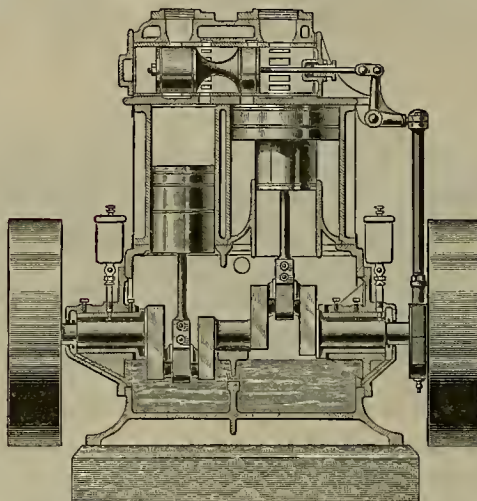
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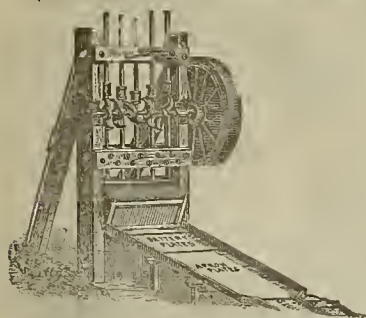
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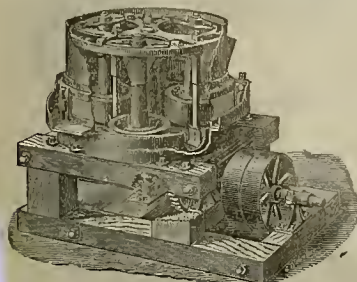
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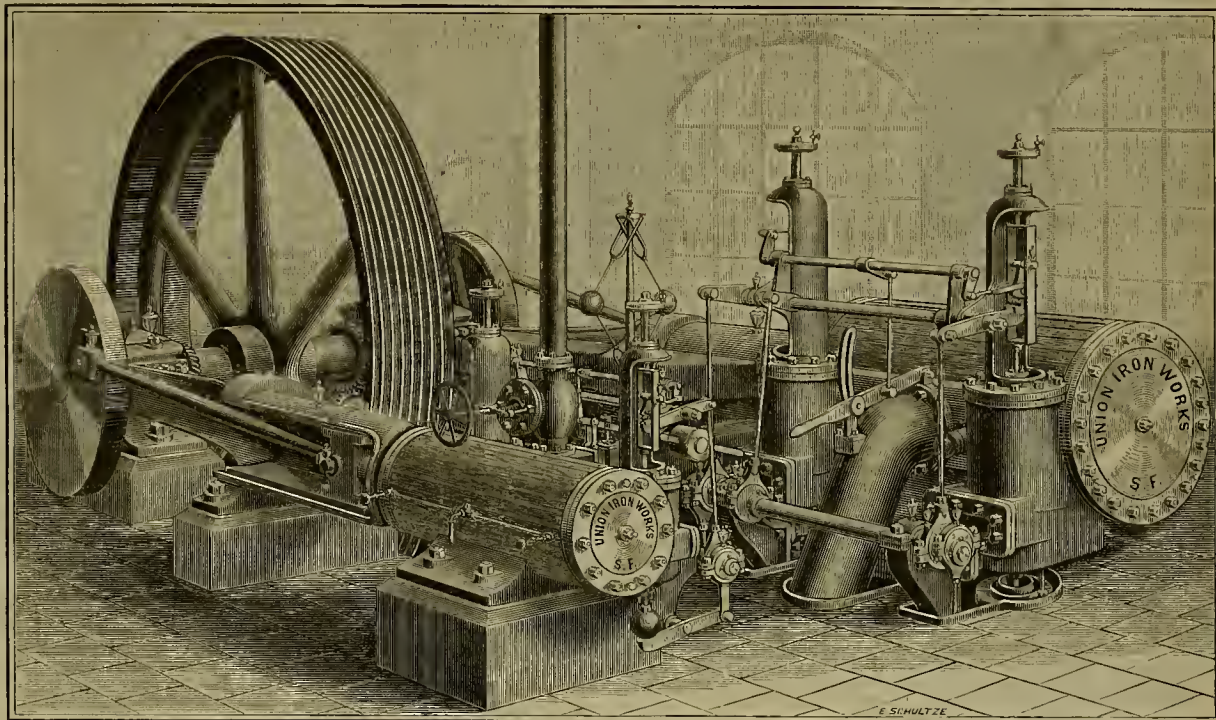
SAN FRANCISCO, SATURDAY, JANUARY 18, 1890.

Three Dollars per Annum.
Single Copies, 10 Cts.

Compound Engines.

There is no other part of the United States where steam-power forms so important a place in general industry as on the Pacific Coast, nor where it is so extensively applied to mining, draining, agriculture, grinding, manufacturing, transportation, etc. The high price of labor compels its use in all possible cases. Among the first to construct compound engines on this coast were the Union Iron Works, who have applied the method in all of its different forms, and to engines of all kinds. The engines shown in one of the engravings on this page are those constructed to drive the main works of the Union Iron Works. They are compound and condensing, with variable cut-off gearing on the first or initial cylinder, and adjustable cut-off valves on the low-pressure one.

The cylinders are 16 inches and 32 inches diameter by 48" stroke, the steam being expanded to nine volumes. The engines are capable of a duty of 250-horse power, and consume only two and one-quarter pounds of good coal for each horse-power per hour. There is a greater gain by compounding when a condenser is used. In cases where fuel is dear, as on the Pacific Coast, and water for condensation can be procured, the extra investment for compounding and condensing is soon regained by the saving in running expense. The Scott & O'Neill out-off engine, also shown on this page, is an adaptation of the disc or poppet-valve system, with variable cut-off gearing to stationary engines. Such engines have been made for the past ten years by the Union Iron Works and applied to various purposes with great success, especially to cable railroad work and



SCOTT & O'NEILL PATENT COMPOUND ENGINE AT THE UNION IRON WORKS.

mining. The total number of engines of this kind constructed to the present time amounts to over 72,000-horse power.

A peculiarity and advantage of valves of this kind is the rapidity with which they open and close, and the large area of the ports. As usually constructed, the length of the perimeter of the valves is equal to twice the diameter of

the cylinder. For an engine of 18-inch diameter the length of the openings or ports, both for induction and exhaust, is equal to a slide valve covering ports three feet wide.

Another feature of these engines is that each is operated by an independent eccentric and can be adjusted at will to regulate the amount of compression and lead. The cross-head,

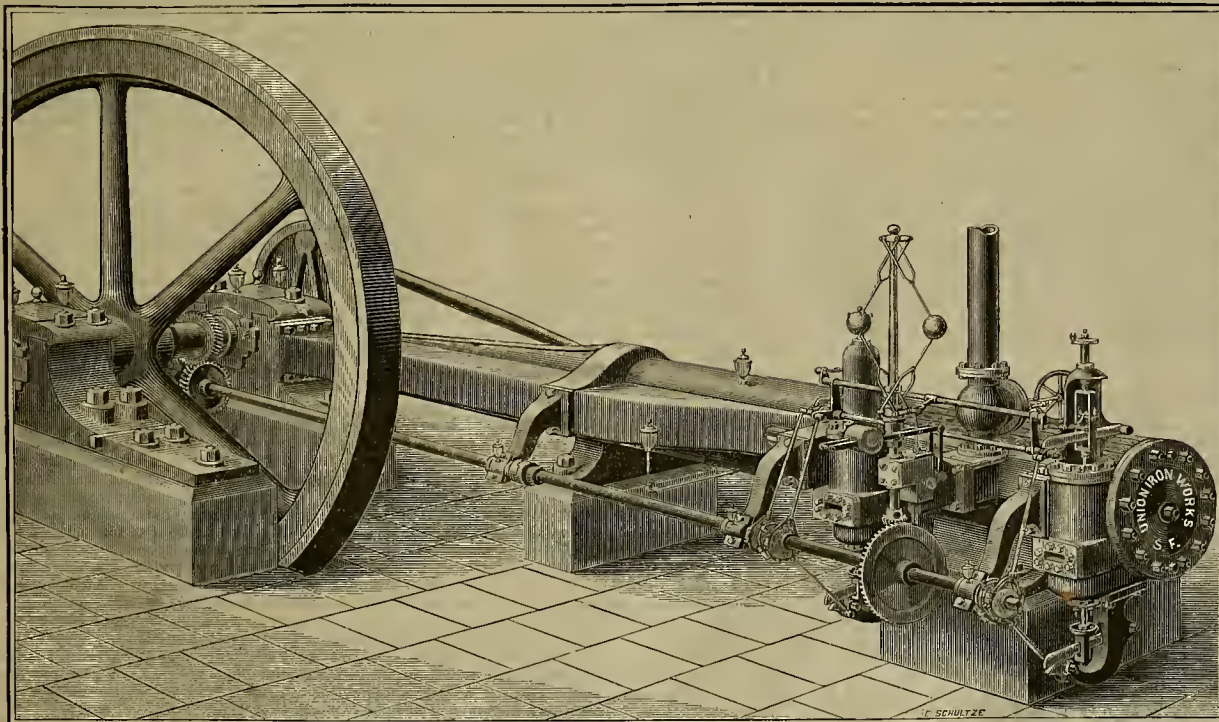
cranks, connection and other of the main details, are all made in accordance with the very best modern practice. The piston-rods are of steel and have patent metallic packing.

Fly-wheels, hand-wheels, rope-wheels or gear-wheels for transmitting power are shipped as wanted. Many of these engines have been arranged for rope transmission, and have performed very successfully with that method.

The cut of this 100-horse power Scott & O'Neill engine shows the valve-gearing and regulating mechanism. The four valves are actuated by the shaft seen in front, and connected with the main shaft by positive gearing. The governor and variable cut-off gearing are also driven from this same shaft, all the connections being positive, but adjustable and easy of access.

The valves are so constructed that they are continually rotating at each revolution, so the faces are kept true and steam-tight without adjustment or grinding. This is an important feature of the system, securing long endurance and economy of steam. The rotation of the valves is performed by the steam and without gearing of any kind.

The governor is driven positively, and is connected by links to the cut-off gearing. The resistance required for regulation is almost eliminated, so the motion becomes sensitive and regular under varying loads. When arranged in the compound form, the low-pressure cylinder has a similar valve arrangement; but the point of cutting off is usually adjusted by hand, the governor acting for the initial cylinder only. They also build them with a governor on both cylinders connected together, thereby giving the same relative admission of steam at all points of cut-off.



SCOTT & O'NEILL VARIABLE CUT-OFF ENGINE—ONE HUNDRED-HORSE POWER.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS.

Californians in Holland and Belgium.

EDITORS PRESS:—We left Heidelberg at 3:50 P. M. for Mayence, arrived at 5:30 and put up at the Hotel de Rhine.

The country from Heidelberg to Mayence is similar to that from Munich to Heidelberg—level, with green fields and compact little villages every few miles, and hundreds of small hop patches. No pasture-lands, no good large barns for storing their crops, and it is a mystery to me what they do with their hay and grain.

I think, without exaggeration, I have not seen 200 head of loose stock out in the fields since I left France, and I am now in the fourth different country—Switzerland, Italy, Austria and Germany.

We changed cars at Darmstadt, and there met a gentleman and wife and son from Los Angeles—Matthay, I think, was his name. We were as pleased to see them as though they had been old friends, and we had a good American talk, and put up at the same hotel in Mayence.

This is quite a town, with some very old buildings. A tall tower close by the hotel they claim to be from 800 to 1000 years old. A fine bridge spans the Rhine, which is a little wider than the Sacramento. Here tourists take and leave the boat for a trip up or down the Rhine.

We take the boat at nine o'clock on the 15th.

A wet, gloomy, cold morning, with, perhaps, 50 passengers. The country is very level here, and the voyager does not get into the hills for an hour or so. The wind is blowing a hurricane, all but the cane, and this is the third time I have worn my overcoat since I left California—once at sea, once off the coast of Ireland and to-day on the Rhine. Not over half of the ladies can stay on deck, and it seriously interferes with the pleasures of the trip. I have read so much about the Rhine, heard it discussed by persons that have made the trip, and as some did not speak in flattering terms, I made up my mind to have no prejudice against it at starting. Some people get too exalted an opinion from others, and consequently they are disappointed when they come to view it. A person should see the Rhine before he sees the Alps or Switzerland, or he is liable to be disappointed. It is entirely different scenery and will bear no comparison. It is good and well worth the trip. The hills are well terraced with stone walls and grape-vines; the high peaks contain old castles and ruins and strong fortifications. We pass Bingen, Coblenz, Bonn, etc., etc., all famous in history or song. There is a railroad on either side with numerous tunnels. At the mouth of each tunnel there is a fancy wall, put up in imitation of towers or castles. The roads seem to do an immense business, from the number of trains we saw passing to-day. A great number of canal-boats were being towed up and down the river. There was not much farming, except grapes, until we got out of the hills and pretty well down toward Cologne.

Cologne is a much larger place than I anticipated. It has a very fine double iron bridge; one side for the public, and the other side, double track for cars, high enough for steamboats without lowering funnels. It has a pontoon bridge, with 42 pointed scow-boats, anchored in the stream, and a great deal of travel. The pontoon bridge was quite a novelty to me. When steamers want to pass, three of the boats were dropped down and behind the others and then pulled back in place by machinery. The streets of the old town are narrow, dirty and crooked. The new part is being built up in fine style. They claim the finest Gothic cathedral in the world. It cost away up in the millions. I am about tired of such luxuries, and I suppose I did not give it that consideration its mechanical merit deserves. I am tired of seeing these idle loafers in their black robes, to see something their grandfathers did.

They make everything work, eat or drink, in this country. The idle do most of the eating and drinking. They get more work out of their dogs than any place I have seen yet. One and two dogs are hitched to nearly every cart, and they pull with a will. I saw a three-tandem team. The man at end of shafts, one dog hitched to axletree, walking on the man's heels, the other dog hitched to the rear of the cart and walking behind the axletree, all doing good work.

They have some very old buildings, the architecture whereof must have been planned in some diseased mind. I took one of them to be the first handiwork of Adam when winter was approaching, and the other built from the wreck of the ark by Noah. I would give a good price for one of these country wagons to drive in a procession on Fourth of July.

We took the cars at Cologne at 1:30 and arrived at Amsterdam at 8 P. M. The country is well tilled, and shows a good growth of second crop of clover in blossom, alfalfa, grain, and an abundance of vegetables. Before we crossed the Rhine, we passed over very level bottom land, used mostly for grazing purposes. And here we begin to see stock out to pasture, and most of it is the black and white Holstein or Dutch cow. Occasionally there is a fence or hedge, but the land is mostly divided by ditches with small bridges and bars and gates.

We crossed the Rhine on a single-track iron ferryboat. String wire cables are fastened to either bank, passing over or around large wheels on the boat, which are revolved by steam pulling the boat. There are two boats, each boat carrying eight or ten cars. From here to Amsterdam is a level country, and water almost on the surface; feed was in abundance and thousands of cattle enjoying it. Nothing but the Holstein cattle are seen. The village system of farming is disappearing, and I occasionally see a farmhouse with barns, stacks, etc.

Amsterdam is built upon a site like that which might be found between Suisun and Benicia, on the tules. The map of the city looks like the three sides of a spider's web, the streets and canals running like the threads of the web, converging gradually toward the center. With all my reading about the city of Amsterdam, I had a very imperfect idea of it. I could hardly realize that there were as many canals as there were in Venice, and much better arranged. Nearly every street of importance has a canal in the center, with streets or roadway on either side. Some canals are 30, 40 and 100 feet wide, and some few narrower. There are 90 islands and 300 bridges that cross these canals from one street to another. Canal-boats are going and coming with their loads, like truck teams. Small steamers built low down ply up and down the largest canal, some as tow-boats and others for passengers.

The old houses are narrow and high, and not one in ten stands plumb. They look as though they would topple over very soon. There are some nice buildings here. It must be expensive to get a proper foundation in such a wet soil.

I believe they claim 300,000 population. I should hardly think it would justify such figures. We took carriage and rode around the city and out to see the dikes. Failing to get a proper map, I found it difficult to obtain the desired information in regard to reclamation. There are so many dikes, canals, levees, etc., that I could not inform myself as I would like to.

We found a young man who could speak good English and willing to impart anything that he knew, but the trouble was, he did not know much about the business and was liable to mislead.

We found another bright young man, apparently an assistant engineer, who had the information, but spoke indifferent English, and it was hard for him to explain. On the outer levee they were doing a fine piece of stone-work. From what I could gather and see, I think they are putting in gates to let out the stagnant water of the city at low tide and let in new water at high tide. They have reclaimed a good deal of land from the inland sea and have it in a fine state of cultivation. They have been most determined and persevering in building up this city and reclaiming its lands. It has cost an immense amount of money, thought and experiment.

I took the little steamer and went up to the town or city called Zaandam, that claims a population of 12,000. I had hardly got ashore when I was solicited by a native to be my guide. I made arrangements with him and we took carriage and started. The first thing he showed me was an old house that had cut over the top of the door, "Anno 1654." We left the carriage and walked through a narrow lane, where stood a modern house, 1825, over an old house built in 1632, and in which Peter the Great lived in 1697, when he worked at ship-building in this town. The chairs and table that he used were there. I had to stoop down to go through the door from one room to another. The boarding on the outside was over a foot wide and the whole thing had the appearance of quite an ancient house. I also walked through the ship-yard where he worked at his trade.

I went in and inspected one of those large, four-armed windmills that we see pictured so much in the old country. Each arm must be at least 30 feet long and they go with tremendous power. This one was pumping water from the land side into the canal. An old man and his wife were living in it and attending to it. Their three sons were at home at the time. The mills are worked with wooden cogs, and have a turntable, so as to be faced to the wind. There is a powerful brake they apply when they wish to stop the mill. They stopped it to show me how it worked. They seemed as pleased to show me the mill as I was to see it. I loaned the old lady a small reminder until I call again. The old gentleman seemed pleased at my attentions to his frau, for he put on a very broad smile, and gave a strong whiff to his pipe.

We drove several miles up a narrow street close to a small canal nearly on a level with the land. Houses were built on both sides, and nearly every house had to have a small bridge to get over to the street.

I am very sorry I cannot stay here at least one week and make a thorough investigation of this old city, with its remarkable history, its dikes and processes and extent of reclamation. Any account I can get of this city, I shall read with greater interest than ever. For want of time I have not visited its museums, art galleries, or zoological gardens, which are said to be good.

We left Amsterdam at 12:30, arrived in Brussels at 6 P. M., and put up at Grand Hotel de Saxe. Having a little spare time before we left, we took a run through a church founded in 1408, which had some very fine pulpit carving and

other oddities; also visited the King's palace. It is a large, plain stone building on the outside, and a person would hardly believe the beauty it contained within. Nearly every room was finished or covered with polished marble of the finest kind. It made a peculiar and rich room. Fine pictures were on the wall and on the ceiling. Each picture was emblematic or had a meaning and was appropriate to time and place. The equestrian statue of the father of the present King was in one of the large rooms. We regretted very much that we had to hurry through so rapidly, as we probably shall never see another marble palace like that, and it was a mystery to us how the economic Hollanders ever allowed themselves so much extravagance.

The trip was through a level country, with canals, ditches and levees everywhere; splendid green grass and thousands of the black and white Holstein or Dutch cattle in every direction. There were no fences, but some good large barns and good farm houses. I do not know that I ever went through such an extent of level ground and such fine feed and crops. In one town, about half the place was occupied with nursery trees, shrubs and flowers and of a very fine growth, and showed a good deal of skill in their training.

With all this rich soil, I had no desire to live on it, but would like to have owned a few hundred acres to turn my stock in to see them grow and get fat. We passed through The Hague and Rotterdam, large, fine places on level ground with water nearly on the surface. Quite extensive improvements were going on at Rotterdam, on the outside of the city, which showed thrift and prosperity.

We intended to stop at Antwerp, but concluded to go on to Brussels and stop as we came back to take steamer for London. We were more favorably impressed with Brussels than any city that we have seen on the continent, outside of Paris. There is a life, thrift and cleanliness about the city that takes right away and makes a person feel at home at once. The merchants have large show windows and have a knack of showing off their goods in a tasteful and attractive way, and causes a desire to buy something out of every window. We went to the lace manufacturers, which was a source of great joy to the three ladies in our party. If the skill of the fair hands in this city can prevent, our ladies are determined that mosquitoes and cold weather shall forever after be a stranger to them, while Mr. H. and myself sit in silent meditation, pondering the price of hops and bouquets in the future. Statues, monuments and columns are plenty. We took a ride on the electric street road which worked well for a distance of about a mile, and some of the way up grade. A great many wooden shoes are worn in this country, and the first pair I saw I thought from the size that the owner was about to perform some great feat in water-walking, so with purse in hand I followed him for awhile, desiring to purchase tickets for his exhibition. I soon saw so many with the wooden shoes that I thought I might see some of their feats without pay—a thing that never occurs in this country—so I saved my gulder and called at the corner to inquire the price of scheideid schnapps.

We were shown through the Hall of Justice, which is a large, fine building, and everything seemed well arranged. We were shown a room where every day, at certain hours, civil marriages were solemnized by the proper official.

We then went through the rain to visit the cathedral—a large, fine building, but no comparison to some that we have visited. Candles were burning by the hundred; men and women were at their devotional exercises. A big, hurly six footer, with brass buttons, cocked hat and long wand, stalked through the aisles and waved back the visitors. I took a seat in one of the low chairs facing, as I supposed, the most conspicuous place in church. He tapped me on the shoulder and turned around my chair, as much as to say, that view is good enough for you heathens. I gave him a low bow and child-like smile by showing my dissent to his judgment, and moved off to another part of the church to commune with what seemed to me best.

Porters or commissionaires are standing on the streets everywhere, especially at stations and hotels, dressed with white houses and brass bands around the arms with numbers. Mr. H. wanted to go to the bank to draw some funds, and was very near to it when he asked one of these men the direction. Two of them started with him to the bank, and as he was about to disappear in the door, both yelled out in broken English, "Commission, commission." Mr. H. said: "I did not ask you to go to the bank, I merely asked the direction."

He went in and got some funds, and as he came out, they repeated again "Commission!" He saw it was useless to talk to them, so he pulled out two pieces of Swiss money that he other natives refuse to take and gave each a piece. While they were examining them to ascertain the value of the queer coin, Mr. H. slid away.

It reminded me of the story of the man riding through a country that was full of wolves, and they made chase, while he would gain a little time by occasionally throwing out a piece of meat or a bundle of something for them to examine and fight over. They will stand at the hotel, and when a hack drives up, the driver will take gripsack off back, and these porters will snatch it up and run in and demand a fee. They continually play into each other's hands, and the best way is to have as little to do with them as possible.

D. FLINT.

Suggestions for Controlling our Rivers.

EDITORS PRESS:—In times of disastrous floods the public will be more open to conviction concerning the importance of doing what we can to control our rivers and prevent the vast damage done by their overflowing, particularly in washing away good soil, so that it is hoped the following suggestions and facts may tend to promote action toward these ends.

Having lived for several years only too near the Santa Clara river of the South, and having sustained considerable damage, both from the recent and other floods, the public importance of controlling this serious, continuous, and in great part needless waste of the resources of the country has been long impressed upon the writer.

It is quite within the truth to say that the loss along this one mountain torrent for only about ten miles, the region best known to your correspondent, has been 100 acres of good farming land within the past six years. This is written with but limited reports concerning our last flood. To estimate that this little county may have lost 500 acres of good farming land in this time is putting it too low. In the flood of '84 over 70 acres were washed away from one ranch alone, Taylor's on the Ventura river, the best part of it.

The public is interested in this waste by its loss of property to levy taxes upon for all time, as well as by the loss to the owner, a part of itself, many of whom are seriously crippled. To offset this loss there is no gain. If the loss to the State at large by this last flood runs into millions of dollars, as rumor already has it, surely the prevention of this for the future is of great public importance.

The plan to be brought forward here had been in successful operation several centuries, along the river Po in Northern Italy, before the great Goethe visited the country about 100 years ago. He was so struck by its great public importance, efficiency and simplicity that he gave an account of it in some of his writings and induced the Government of Weimar to try it on some of its small rivers.

The physical geography of the valley of the Po is very like that of our Sacramento and San Joaquin basin; both being liable to floods from sudden melting of mountain snows; a long extent of both valleys being very flat. For ages the loss to population and property in the valley of the Po had been enormous, until the following engineering plan was adopted: This consisted essentially in building solid immovable jetties into the current, where it tended to encroach, or to spread out too much, making the current swifter and deeper so that it washed along much loose material, stones, etc., that had formerly caused frequent changes of channel by obstructing old ones. Jetties being built along the whole course of the stream, on alternate sides as the current required them, it was also prevented from making these dangerous changes of channel and confined to the most suitable course at will. The eddies formed below each jetty catch and deposit the light particles, which in time amount to considerable soil, thus reclaiming flat land not needed for the water-course.

Our celebrated American engineer Eads followed practically the same plan in successfully deepening and keeping free one of the mouths of the Mississippi river, where he had to contend both with the enormous deposits brought down by the river, its current, as well as with the ocean tides.

If, now, the river Po has been successfully controlled for centuries, and the mighty Mississippi for years, surely all California rivers may be held within bounds, Sacramento and San Joaquin, as well as the mountain torrents of which there are so many.

For broad, sandy-headed streams like the Santa Clara of the South, constantly shifting its channel and making new distribution, its banks being almost entirely of rich farming or occasional sandy lands, the most suitable jetty that I have been able to think of would be one made by driving long, strong piles, such as the railroads use for bridges, at the proper places and angles to the stream, spiking strong planks to them from below the sand bed to as high a point as the water rises in floods. As the length of these jetties need seldom be over 25 or 30 feet, and as they might often be a quarter of a mile or more apart, the expense would not be too heavy to be borne, especially if all riparian owners, as well as the public, shared in it equitably. Here the value of reclaimed land would be considerable.

Of course the possibility of this being done at all depends upon its being given in charge to some public authority, whether of State or counties singly or jointly, so that some connected and sensible scheme could be followed; this to be determined by persons better acquainted with public affairs or engineering than the writer.

Surely some of our county money now wasted on plowing up the dirt roads once in awhile would be better employed in controlling the streams, and if the politicians would only allow us to enjoy as rational and profitable public control of our rivers, to lessen damages by floods, and of our forests, so closely associated with regulating the flow of the rainfall into the streams, to prevent floods, they would allow us to enjoy in this "free country" what some of the "effete monarchies of Europe" have had for generations.

Ventura Co., Dec., 1889.

Liberty Mining District, Siskiyou Co.

EDITORS PRESS:—There is probably no section in California which offers better inducements for extensive hydraulic placer mining, or any so long neglected, as Liberty mining district, Siskiyou county.

Mining capitalists seldom reach farther than Etna Mills, owing to the termination of the wagon-road at that place and to the inconveniences of traveling mile-back over the mountain trail, which continues on from Etna Mills across the Salmon range into the north fork of Salmon river.

There, there are many large deposits of gravel bars and high benches which are very rich, affording a productive field for hydraulic mining.

The facilities for hydraulic operations are all that can be desired. The water privileges are excellent. The river, having a natural descent of over 30 feet to the mile, makes sufficient water available for all necessary purposes.

One decided advantage this district possesses in regard to hydraulic mining is the liberty to dump the debris into the streams. There is not a spot along the entire course of the river from its sources to where it empties into the Klamath, and from there on to the coast, that is devoted to agriculture; thus no complaints ever arise to interrupt the constant running of the mines.

Owing to lack of capital, the "river bars" have been practically untouched with the exception of the rims and outlets which have been sluiced two or three times over with remunerative results. Good wages are being made by the miners working the gulches and shallow deposits along the river.

Quartz mining has taken a rapid stride during the past year, and the present outlook for the future is certainly encouraging. Many rich leads have been discovered, several of which, though worked on a small scale, are paying handsomely.

The present heavy snowfalls in the mountains are eagerly welcomed by the miners, who all expect a long and prosperous run next season.

FRANK H. HALL,

Etna Mills, Siskiyou Co., Cal.

Mining Accidents Prevented.

EDITORS PRESS:—In reviewing the late fearful, fatal catastrophe at the Utica mine, such might have been prevented had the worked-out ground been filled in between the timbers by debris, obtained if from no other available source, from the surface, by making apraises, passes, or chutes, and so shoot the waste material into the worked-out stopes or open spaces, thus compactly securing the ground. This would prevent any possible chance of collapse, if properly filled up to the weak surface portion of the mine. This system is made compulsory in the New Zealand mines, and should be carried out in all extensive mining operations, for it is always practicable. In New Zealand the mines are carefully inspected monthly, and oftener when there is a suspicion that danger may exist, by a competent mining engineer, who is a regular appointee of the Government in the capacity of mining inspector. An Act of the Legislature of this State should be passed, enforcing some such regulation, whereby the lives of the miners may be better secured, and accidents generally in mines reduced to the minimum. ARGUS.

A MINE MYSTERY.—While a party of miners were doing assessment work on what is known as the Black Sulphurets mine in Irish Mountain, Nev., for A. W. Gear, George Blythe, the leader of the party, while cleaning the debris from the above mine and after cleaning out about two feet of the accumulation, struck some bones, the first being the nether jaw-bone, and after a thorough search a full human skeleton was unearthed of a white man about six feet in height. This mine has not been worked for 15 or 20 years. The shaft was 26 feet deep, 6 feet long by 3 wide, and was dug in such a way that the dirt on the corpse could not have got there but by being thrown in by human agency. There is a story that that two men left Northern California some four years ago, one of whom had had his left thigh-bone broken. Afterward the other returned and said his partner had been killed in Irish Mountain.

AN ELECTRIC METER.—So general is becoming the use of electric lights that a meter to make an equitable charge to consumers for the amount of current actually utilized is a necessity. Repeated experiments in this direction have been made, but with indifferent success. The latest invention, and which expert judges pronounce a success, is that of Albert H. Minnaren, a brother-in-law of M. D. Law, formerly superintendent in this city of the Brush Electric Light Co. Hitherto those who need electric lights have been at the mercy of the company, but with the meter it is stated that the precise amount of current utilized is recorded—a great convenience to those who use either electric light or electric motors.

A DISPATCH from Brussels says that the mine-owners at Charleroi, where strikes are in progress, will make no concessions, thinking that the miners will not be able to hold out long. This action has greatly incensed the men, and the strike is assuming alarming proportions.

Trusts Declared Unlawful.

A little while ago the country was greatly agitated over the spread of anarchical socialism. The people stood aghast before the Haymarket outrage in Chicago, and the alio authorities hastened to stamp out the evil as they would the plague or a fire. But in the meantime there has been steadily and silently growing in our midst a more mischievous and alarming evil, one that threatens to strangle the leading industries of the land. It differs from Chicago anarchism in the agencies it uses. The poor, hear-soaked, fanatical anarchist throws bombs; the capitalistic anarchist proposes to so manipulate the law governing partnerships and corporations as to manufacture a vast shield to protect their schemes.

Such is the attitude of the so-called trusts or combines that have so alarmingly multiplied of late. The following indictment may be filed against the trusts:

1. They tend to build up monopolies and drive small capitalists out of business.
2. They destroy competition, the great multiplier of profit and equalizer of prices.
3. They amass fortunes at the expense of the community by increasing the price of commodities.
4. They build up an oligarchy which wields its own interests against that of the community, thereby endangering personal freedom and menacing the existence of democratic institutions.

It is a matter of gratification that our courts so far have been so prompt and pronounced in trying to arrest the spread of this evil. Judge Barrett of New York was the first to declare the Sugar Trust a "criminal enterprise," and his opinion has been ratified by the Supreme Court of that State. And now Judge W. T. Wallace of this city has dealt the trust-method of doing business another staggering blow. It will be remembered that on the 5th of November, 1888, the Attorney-General, G. A. Johnson, filed a complaint in the Superior Court of this county and city, alleging that the American Sugar Refinery of this city had violated its charter by joining the Sugar Trust, thereby disregarding the purposes for which it was incorporated by surrendering the management of its concern to a body of men known as the Sugar Refineries' Company, usually called the Sugar Trust. That said company is not a corporation, but is an unlawful combination and monopoly, acting in the restraint of trade, and that the American Sugar Refinery Company by amalgamating with the Sugar Trust had ceased to maintain its identity and exercise the functions for which it was created and had therefore forfeited its charter. These allegations Judge Wallace has in his decision ably and lucidly maintained. After stating a finding and a few established principles, his honor says:

"The stated purpose for which the 'American Sugar Refinery Company' became incorporated was the production—the competitive production—of sugar to supply human want; the business franchise granted was not for the sole benefit of the corporation or its stockholders, but, in a measure, for that of the public as well; the understood commercial policy underlying the grant, and to the observance of which the defendant, by accepting it, stood committed, looked to the promotion of trade in that commodity—the promotion of trade necessarily denotes the encouragement of rivalry in the business—competition on equal terms is conceded to be the life of trade, and to invite and promote that competition is the established policy of our laws. As competition tends to create trade, so monopoly tends to destroy it. This is the axiom which underlies the Constitution and general legislation of this State, and upon which the decisions of its courts have habitually, not to say uniformly, proceeded."

We quote this clause of the opinion because it has an ulterior bearing. Judge Wallace here clearly holds that a corporation is not created for the sole benefit of the incorporators, but for the welfare of the public as well, and that a monopoly injures trade by destroying competition in business. Now where shall we place the limit to this principle? Jay Gould controls the telegraph. A few railroad barons control transportation. A trust is a partnership of corporations, and such a combine is declared illegal and void; then why not be equally prompt and stern in limiting the powers of a corporation managed by one or more men? The only difference is that in one case we are under an oligarchy and the other under a despot.

But let us not shoot before we are out of the woods. Trusts are lucrative and will not die easily. The action of the North River Sugar Refinery Co. in commencing to wind up its affairs looks as if it had been compelled to go out of business by the force of Judge Barrett's decision, but the New York Times says "the scheme is an attempt to throw over the Sugar Trust as it stands the cloak of a Connecticut charter, in order that the trust may carry on its business as heretofore and in defiance of the courts of the State of New York." An effort may be made here to flank Judge Wallace's decision by a similar subterfuge. It is understood that an appeal will be taken to the Supreme Court, which, if it furnishes no hope, may at least give the protean business time enough to change its shape and color, and it may emerge in another form.

But why stop here? The whole family of trusts are illegal associations of capital, secret or semi-secret financial conspiracies, the object

of which is to artificially enhance the price of an article by monopolizing its manufacture and exercising a policy of brutal force and terror against all possible competition. We have the Standard Oil Trust, the Cotton-Seed Trust, the Rubber Trust, the Cattle Trust, Coal Trust, Gas Trust, and the Beef Combine, that monopolizes and controls the live-stock market throughout the Northwest and Middle States and levies a tax on every pound of beef, pork, mutton, lard, fish, and is steadily crowding the small traders who do not come under the wing of the vulture.

Arizona Minerals.

Wm. P. Blake in American Journal of Science.

The deposits of sulphate of soda of the valley of the Verde river, A. T., near the military post of Camp Verde, have long been known and extensively quarried by the ranchers of the region as a substitute for salt for cattle and horses. The occurrence of thenardite in Arizona was first made known to science by the late Prof. B. Silliman, in 1881, but he had not visited the locality and it has not been described. A recent visit to the place, and a somewhat hurried and superficial examination, enabled me, however, to collect and identify other allied species in association with the thenardite and a peculiar pseudomorph of carbonate of lime after glauberite.

The deposits of the thenardite and associated minerals are of considerable magnitude, covering several acres in extent, and reach a thickness of some 50 or 60 feet or more. They appear as a series of rounded hills with sides covered with a snow-white efflorescence and greenish-colored and yellow clay at the bottom and top, partially covering the saline beds from view.

These beds are doubtless remnants of a much more extended deposit which occupied a local lake-like depression, or basin, probably at the close of the great volcanic era during which most of the mountain valleys of Central Arizona were filled up by sediments and then overlaid by successive streams of lava. Sedimentary beds of volcanic origin remain throughout the Verde valley and its chief tributaries, and in the region of Camp Verde are deeply eroded, but rest on the uneven floor of ancient pre-Silurian slates standing on edge. High above the deposits of the valley, vertical cliffs of hard lava mark the edges of extended masses of *malpais*, under which all the other formations are hidden and protected. But the excavations in the banks of the sulphate of soda are insignificant in comparison with the magnitude of the beds, and have failed to show, conclusively, any bottom or top, or to reveal the true relations of the beds to the surrounding formations. Whether or not they are members of the volcanic series or of a later and more local origin is yet uncertain.

Thenardite.

This salt constitutes the bulk of the deposits. It is a coarsely crystalline mass, so compact and firm that it can be broken out only by drilling and blasting with powder. It varies in its purity. Some portions are more or less contaminated with a greenish-colored clay, but it is obtained also in large masses nearly colorless and transparent, with a slight yellowish tint, but seldom showing crystalline forms.

Mirabilite.

The hydrous sulphate of soda occurs in close association with the thenardite and appears to penetrate its mass in veins, but may prove to be an overlying bed. It is this species which, by its rapid efflorescence when exposed to the air, covers the whole deposit with a white powder and a thick crust through which the quarrymen must cut before they reach the solid banks of the anhydrous sulphate.

Halite.

Rock salt in beautifully transparent masses is sparingly disseminated in portions of the great beds. These crystalline masses, so far as observed, do not exceed an inch or two in thickness, and no evidence of the existence of any separate workable beds could be seen. It is irregularly disseminated in the sulphate. Some masses exhibit beautiful blue tints of color, like those seen in the salt of the Tyrol and of Stassfurt. Good fragments for optical and thermal experiments could be obtained here.

Glauberite.

This anhydrous sulphate of lime and soda is an interesting associate of the other species. It occurs chiefly near what appears to be the base of the deposits in a compact green clay. It is in clear, transparent, colorless crystals, generally in thin rhombs, lozenge-shaped, with the plain angles of 80° and 100°, and from half an inch to an inch or more broad and one-eighth to one quarter of an inch in thickness. The prismatic planes, *I, I*, are generally nearly obliterated, or are absent, through the great development of the hemi-octahedral planes—*L*, replacing the obtuse terminal edges. The terminal plane, *O*, is chiefly developed, and this, with the broad planes replacing the obtuse edges, gives to some of the crystals the appearance of rhombohedrons of the *minerals* series. The general habit of the crystals is similar to those from Westergeln, near Stassfurt, described by Zepharovich, with the predominating pyramid—*1*, occur also the pyra-

mids—*2*,—*3* and either—*4* or—*4-5*; traces of a pyramid on the acute edges have also been noted. There is evidence that the crystals vary greatly in size and in their habit in different parts of the deposits. They occur also in the midst of portions of the solid thenardite as inclusions, and in one instance a small crystal was found in the midst of a transparent mass of halite. Close inspection of the transparent tabular crystals from the green clay reveals the presence of crystalline cavities with fluid inclusions made evident by the movement of small bubbles. When heated, the decrepitation is violent.

Carbonate of Lime Pseudomorphs.

Where the lower bed containing the bulk of the glauberite crops out at the surface and has become oxidized and dried, the glauberite disappears and is replaced by carbonate of lime in an amorphous condition, but having the exact form of the glauberite crystals, whose matrix they have filled. These pseudomorphs are firm, compact and dense, but are without cleavage or interior crystalline structure. Color, cream yellow. They weather out in great numbers, and show that the glauberite once occurred in a great variety of sizes and forms of aggregation, in some places in rosettes and in others in crystals two or three inches long.

Bournonite in Arizona.

Bournonite occurs sparingly at the Boggs mine, Big Bug district, Yavapai county, Arizona Territory, associated with pyrite, zinc blende, galenite and copper pyrites. The crystals are brilliant and characteristic, with interesting modifications not yet studied and compared. This is believed to be the first announcement of the occurrence of this species in the United States. I am indebted to Fred E. Murray, E. q., superintendent of the mine, for specimens.

Railway Construction in 1889.

The *Railway Age* of December 27th publishes a tabulated statement by States of the railway construction (main lines only, not including sidings and additional tracks) in the United States for the year 1889. A recapitulation of the compilation gives the following summary by groups:

	Lines.	Miles.
New England and Eastern group.....	69	557
Central Northern group.....	46	784
Southern group.....	97	1,829
Southwestern group.....	37	792
Northwestern group.....	23	615
Pacific Coast group.....	39	674
Totals.....	316	5,231

The above shows a falling off compared with 1888 of 1800 miles, and that of 1887 of about 7800 miles. By an examination of the above, it will be seen that the list only embraces the line upon which track-laying was an accomplished fact, and therefore does not include the roads graded and not yet railed. The average mileage of each line completed was in 1889 only about 164 miles, against about 20 miles in 1888, which goes to show that the work last year was chiefly done on small extensions and branches. The *Age* in commenting on this fact says that the element of parallel railway building which caused the excessive and unhealthy activity of several previous years has been almost absent, and in nearly every case the extension or new road has been built because it was believed to be needed and not chiefly to get away business from a competitor.

The southern group of States shows the greatest degree of activity in railroad building, and a much larger proportion of development when area and population is taken into consideration. The Southwestern States and Territories have made considerable progress, but not one-half that they made in 1888. The Northwestern States have about held their own, while the Pacific Coast States have fallen off slightly, notwithstanding the large construction (398 miles) in Washington, owing to California's small mileage of 120 miles, against 600 miles in 1888.

The *Age* is authority for the statement that the addition of, say 5300 miles of new road during the year, means that, at the moderate average of \$20,000 per mile, the vast sum of \$106,000,000 has been invested in their construction and equipment, and that employment for the future has been furnished thereby to from 25,000 to 30,000 more men who will be required to carry on the operations of these lines, while thousands more will be kept busy in applying the various manufactured articles, the demand for which is increased by the addition of every new mile of railway.

THERE is nothing new in regard to the dreadful cave in the Utica mine. The bodies of the dead miners are still buried in the drift. Work is progressing in the direction of the dead, and ore is being extracted as usual. It may be a year before all the dead bodies will be reached.

The gas company of Jackson, Amador county, changed its process last year from coal to gasoline. At their annual meeting it was shown that the change did not work well, as the quality of the gas was inferior while the cost was fully equal to the old process.

THE hoisting works, machine and blacksmith-shops and sawmill of the Anchor mine, Park City, Utah, were destroyed by fire on Wednesday morning.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Alameda.

GOLD DISCOVERY.—Livermore Herald, Jan. 11: Some years ago Wm. M. Mendenhall discovered what he considered to be copper ore on the hillside near the large spring at Agua de Vida, 10 miles southeast of this place. The ledge was unearthed in digging a trail from the cottages to the spring. Last summer Mr. Mendenhall decided to run a tunnel into the hill on the ledge. He did so, getting in about 30 feet. The ore he took out was seen by quite a number of people, nearly all of whom pronounced it copper. Recently he sent three samples down to Price's assay office, and this week he secured a return, which, to say the least, astonished him. Of the three samples of rock, that from a small vein assayed 84 cents in silver and \$3.10 in gold per ton; that from a ledge, 13 cents in silver and \$2.07 in gold; and the quartz, 45 cents in silver and \$9.30 in gold. This gives a return of valuation of the three specimens of \$3.94, \$2.20 and \$9.88 respectively per ton.

Amador.

SUTTER CREEK GOLD MINE.—Ledger, Jan. 11: The mill was brought to a standstill on Sunday, on account of the Amador Canal Co.'s flumes giving way. The mill resumed crushing last Thursday. Two shifts are now employed in the mine.

Calaveras.

QUARTZ AND GRAVEL.—Calaveras Prospect, Jan. 11: The persistent rains of the past month and a half have interfered very greatly with the active mining developments in this region of the State, but the amount of water now assured for the dry season will compensate for the present inconveniences to mining operations. The snow fall in the mountains is ample to furnish an abundant supply of water for the mills and mines. The past year has given mining in this county a great impetus, and with the present encouraging prospect we anticipate much mining enterprise in the future. In our immediate vicinity we hear that the Union mine will soon again commence operations. The London syndicate that is working this mine has not spared money for a thorough and complete test of the genuineness of this mine, and contrary to all reports "the holes in the ground" contain a fine body of ore. It is expected that all legal encumbrances will be lifted within a few days, and work will be resumed. Operations about Murphys and on the Stanislaus river are at a standstill for the present, owing to the weather. The Norfolk, Mr. F. B. Morse, superintendent, is making vigorous headway, despite snow and rain. At Robinson's Ferry, the new Huntington mill on the Calaveras mine is now in operation. The ore of this mine is said to be paying good returns. West Point has aspirations for the mining championship in the county. Prospecting in that section has been very active, and the indications for a revival of the mining boom are fair. Another district that is at present the center of attraction in mining circles is the historical and old-time Central Hill, famous in the 60's for its enormous yield of gold. The gravel mine lying dormant for the want of capital and enterprise will yet prove highly remunerative. The outlook in this district cannot but attract the attention of practical mining men, and the old gravel mines will be made to yield their glittering sand. Calaveras is just now a mining county of no mean importance. Its quartz mines are good and are being worked by moneyed men. Its gravel mines are undoubtedly very good, and there will soon be a new era in gravel mining. Its copper mines at Copperopolis are in the midst of great activity, and they have been re-opened "to stay." There is said to be sufficient ore on the ground to supply the smelting works for the next 10 years.

Inyo.

FISH SPRINGS.—Inyo Register, Jan. 9: This old mining district, which in early days gained a credit of \$225,000 gold output, is again coming to the front apparently to stay. The old McMurtry and Westerville mines on Fish Springs Hill, at present the property of John Welch and J. D. Mairs, are under bond to gentlemen representing a company organized in Chicago and Scotland, and present condition of negotiations indicates a speedy and important sale. J. N. Rose has a lease of the new ore concentrator which was put in the Maxim mill by McConnell & Davidson, and is getting good returns out of the hundreds of tons of rich tailings on the site of the old Fish Springs arastras. A number of new properties situated about five miles to the northward and four miles southwesterly from Big Pine are looming up as tangible producers. Henry Melone and C. F. Fuller, a team of veteran prospectors, are drifting on a 2-foot ledge at the bottom of a 100-foot shaft. A sample lot of 3 tons of the ore yielded \$65 per ton net, by arastra process. Doc. Graham and John Elliot have a ledge opened by a 130-foot tunnel, and 10 tons of \$60 ore on the dump. As the result of about four months' work, another party recently sold to A. K. Engley \$600 in gold. McCarty, the old stand-by arastra man of that country, lately bought a ledge from a Mexican, and got the purchase-money and \$100 more out of the ore already extracted. Harry Hearne keeps up his lick on the placer as of old. Ahern has tunnels 200 and 300 feet in length, running for gravel. O'Brien, Daley, Lavelle and others are working at different points. The region lies in the foothills on the east base of the Sierras, in a porphyritic and gold-bearing belt which extends from Mammoth to the Alabama mountains. It abounds with timber and water-power, and is accessible all the year round.

Mono.

RELOCATED.—Virginia Chronicle, Jan. 11: The Mocking Bird mining location in Homer district was relocated at midnight on Dec. 31st, the original owners having failed to perform the annual holding work. The Mocking Bird is said to be one of the most promising locations in the district. It is now known as the Wolverine.

Nevada.

PROSPECTING NEAR SPENCEVILLE.—Grass Valley Union, Jan. 11: There are a number of mineral-bearing veins in the vicinity of Spenceville, on what is known as the copper belt, but they contain other

mineral besides copper, as it is found that they prospect both in silver and gold, and it is for the latter that quite an amount of prospecting was done during the past season. The unfavorable weather for the past few months has mainly suspended such operations, but with the opening of spring, and the cessation of storms, it is contemplated to renew work actively, as it is considered that the prospects are encouraging. It is well known that the copper mine at Spenceville is worked at a profit, making regular shipments of cement copper, but if to this can be added gold and silver the Spenceville district may become prominent for its mineral wealth. Practical miners have confidence that good mines can be opened there.

AROUND GRASS VALLEY.—Union, Jan. 9: The freezing weather serves to interfere somewhat with the operations of the quartz-mining companies of the district, as it is an obstacle to amalgamation, and besides checks the flow of water. The Idaho mill has been frozen up three days and the North Star mill at present is only run at night-time on account of a scant water supply. The Idaho mill will start up again to-day. At the Empire mine there has been no interruption, and everything is reported to be going on as usual. At the Peabody mine nothing is being done more than to keep the pump going and holding the water. Arrangements have been made to get 20 inches of water from the town reservoir for power to keep the pump going. No underground work will be undertaken until milder weather enables full water-power to be obtained. The cold weather interferes also with milling at the Omaha. The water-power to run all the machinery is ample. Work is going right along at the Hartery, and the mine continues to show up well in high-grade ore. Out at the Maryland mine the snow is three feet in depth, and on Tuesday night the wind drifted the snow until it filled the trail, and the men going to and from their work found it difficult to get through. The work of running a crosscut in the Maryland ground is going on steadily.

Plumas.

NEW QUARTZ-MILL.—Greenville Bulletin, Jan. 8: We are informed that a new 10-stamp quartz-mill will be erected next summer on the Winona claim, situated about one-half of a mile southwest of Greenville, and that a company is now being formed for that purpose. The new mill is designed to crush ore not only from the Winona but from other quartz mines needing the use of a custom mill.

Shasta.

SQUAW CREEK.—Redding Free Press, Jan. 11: The Uncle Sam M. Co. has just completed the erection of a large air compressor at the mill. They are laying a 4-inch pipe to convey air from the mill to the tunnel which they are driving, a distance of three-quarters of a mile. Said tunnel is in a distance of 500 feet and it will require an additional 800 feet in order to reach the vein. The company expects to have the power drill running in a few weeks, when much better progress will be made.

FROM IGO.—Cor. Courier, Jan. 11: The continued heavy rains proved too much for the hoisting rig at the Crystal, and they have shut down till spring. At the Chicago they have the shaft timbered, and are running drifts at the 150 and 200-foot levels. Excellent ore is coming out of both levels, although the work is slow, owing to the difficulties of hoisting in bad weather. F. Gihney is developing a large ledge of promising quartz at the head of Spanish gulch. Work continues in the lower tunnel of J. P. Wright's sulphuretted ledge. The arastras are temporarily shut down, owing to the soaked condition of the mines, as well as depth of snow in the roads. Whit George and Doc Dunham have put up a power arastra on their Muletown ledge and will be ready to run in a few days. Not much placer mining is being done at present, the gulches having been pretty well cleaned out in former years.

LOWER SPRINGS.—Cor. Democrat, Jan. 8: The first day of January, 1890, appears to have been a very interesting day for prospectors in and about this district. Quite a number of quartz-seekers of Redding were feeding out this way for the purpose of jumping ledges; also to hunt up some rich deposits. Since Halley made his new find, there has been quite a number of inquisitive ones trying to hunt him up, but as yet his whereabouts cannot be discovered. One of the Hills from Redding has jumped the Keystone mine, formerly Mrs. Kempton's location. Bassett, from Redding, has located the old Hairgrave ledge, on the old Shasta road, a little above Salt creek. Some person has located the west extension of the Eastern Star. The Lucas property has been jumped by Ed Taylor. There are men employed working out assessments on the Van Bergin property on the Igo road. It is reported that parties are running a tunnel in the hill just above the old Gage place. Hall & Co., I believe, are carrying on the enterprise.

Sierra.

TUNNEL.—Mt. Messenger, Jan. 4: The new main tunnel of the Bald Mountain Ex. Co. is in over 3600 feet, and is being steadily pushed ahead for the channel.

Siskiyou.

SALMON RIVER.—Cor. Yreka Journal, Jan. 11: The mines of this section, both quartz and placer, are, and have been for some time past, closed down, owing to the scarcity of water. There is an abundance of snow to make water, but it will require a rain to start. Our miners are looking to a long and prosperous run, as never since 1859 has there been as much snow as there is this winter. The Gold Ball quartz mine is destined to equal, if not exceed, any mine that has ever been discovered in this section. Even the famous Black Bear, in its palmy days, pales into insignificance when compared with the Gold Ball. A winze has been sunk from the lowest tunnel a distance of 53 feet; at this depth the ledge is three feet thick, and carries plenty of free gold, in short, the deeper they sink, the bigger and richer the ledge appears. There is an abundance of ore in sight to keep the mill busy for several years. The 16-stamp mill was started up in November, and after a run of 25 days was compelled to shut down, as the supply of water gradually froze up. There is on hand at the mill at least 1200 tons of ore. Judge Hughes, John Grant and Joe Stevens have located and done considerable work on what is supposed to be the extension of the Gold Ball ledge. They have run two different tunnels, one of them 40 feet in length. In this tunnel they have uncovered a five-foot ledge of quartz, which prospects well. Messrs. Probasco, Stent, and H. Welker have discovered a ledge which will be remunerative. These men

have done considerable work to develop their mine. They have a tunnel run on the ledge, a distance of 80 feet. The ledge is from 12 to 18 inches in thickness, and carries free gold. It is estimated that their rock will yield at least \$20 to the ton.

NOVELTY.—Cor. Yreka Union, Jan. 9: The late storms have almost suspended quartz mining in this camp. Stopping had to be discontinued, on account of the water coming through from the surface. The Hansen, Gold Run and Know Nothing are the principal mines of the camp. They are all similarly situated, with development tunnels to tap the ledges at the depth of 300 feet from croppings, and open up levels 100 feet below present workings. The work is now being prosecuted by two shifts of miners, working night and day, and will be continued until the ledges are reached. Then I am in hopes to be able to report developments of permanent value, as much of the future of this camp depends on developments made in those levels. The last cleanup of the Know Nothing mill was a little over \$6000, with the usual expenses of about \$1500. Supt. Black, of the Know Nothing mine, is slowly recovering from injuries from a heavy fall three weeks ago and has been confined to his room continually since. The last cleanup of the Gold Run mill paid \$40 per ton, which gave the four partners a handsome dividend, and the Hansen mine did about the same. These three mines have paid handsomely in the past, and have much ore in sight in their stopes, enough to run them two years on dividend-paying ore. The placer miners have a good season in this district, and will undoubtedly take out more gold than has been taken out in the past three years. The prospects for southern Siskiyou are certainly flattering, and we predict great prosperity in the near future.

Trinity.

QUARTZ AT HAY FORK.—Journal, Jan. 11: Shephardson & Miller have been developing their ledge, which is situated about five miles from the town of Hay Fork, in a southerly direction, and they feel assured that now they have one of the finest prospects in the county. The ledge is about four feet wide and has well-defined walls. The ledge has been traced on the surface for 1000 feet. They have a shaft sunk to a depth of 75 feet, following the ledge the entire distance, and we are informed that the gold is as abundant at the bottom as at the top of the shaft. About one foot of the under side of the ledge prospects about \$20 to the ton, while the other three feet goes about \$300. Present indications point to a good quartz camp at Hay Fork in spite of the prophecy of many to the contrary.

EAST FORK.—From a private letter to a gentleman in town we learn that the mill on the Yellow-stone mine in East Fork district is running and that the mine is looking well.

Tuolumne.

GOLDEN GATE.—Sonora Democrat, Jan. 11: On the Golden Gate mine half the stamps are running dry and half wet—using on the latter a Frue and a Shaw concentrator. This will test the comparative merit of the dry crushing continuous Boss system of roasting and amalgamation and that of concentration and subsequent roasting. There has been received at the Bonanza mine an Ingersoll drill for work in sinking the shaft. It is the improved Ingersoll. The improvement consists in reducing and simplifying the number of parts. It substantially makes the machine a new one. Miners of experience who used the first form of the Ingersoll considered it cumbersome, liable to derangement. This has been overcome in the present improved form. It is a solidly constructed machine of few parts and light weight, and will do more effective work. It will be operated by the compressed air taken from the Richmann compressor belonging to the mine, and the latter is driven by water-power. This will greatly reduce the expense as well as hasten the work of development. Mr. G. F. Johnson of S. F. arrived in Sonora last week on mining business. He was unable to visit the mines he wished to examine in the interest of S. F. parties by reason of the heavy and unusual snowstorm of the past few days, but obtained important data as to certain mines that will lead to definite and early action, and to the industrial benefit of the county.

NEVADA.

Washoe District.

SIERRA NEVADA.—Virginia Chronicle, Jan. 11: On the 500 level at a point in the south drift from the east drift, 275 feet from the main east drift, an east drift is advanced 392 feet, the face continuing in porphyry showing streaks of clay.

UNION CON.—On the 1455 level in the north lateral drift 100 feet south of the north line of the mine, west crosscut No. 4 is advanced 112 feet, and now in porphyry and clay.

OPHIR.—On the 1300 level from the end of the east crosscut from the shaft station a south drift is advanced 233 feet, from the end of the east crosscut, 316 feet from the shaft station, continuing in porphyry mixed with quartz showing value.

MEXICAN.—On the 1455 level from the north drift from west crosscut No. 1, 50 feet in from the lateral drift face, west crosscut No. 2 is advanced 122 feet in porphyry and clay.

CON. CALIFORNIA & VIRGINIA.—From the stopes on the 1300, 1435, 1500, 1600 and 1650 levels the ore yield during the past week has been considerably less than usual on account of the Eureka mill having been shut down the past few days, the accumulation of ice in the Carson river making it impossible to operate the mill. On the 1650 level, from points heretofore designated continue to extract ore. The north drift from the winze bottom, 60 feet below this level, is extended 505 feet, and are extracting ore from this point. During the week 1095 tons and 480 pounds of ore were shipped to the Morgan mill, 661 tons and 590 pounds to the Eureka mill. The average assay value of all the ore worked at these mills during the week, according to battery samples, was \$25.77. Shipped to San Francisco bullion valued at \$44,870.72.

BEST AND BELCHER.—On the 1000 level east crosscut No. 1 is extended 82 feet. Formation, hard porphyry. On the 1200 level, station has been repaired and north drift cleaned out and repaired a distance of 30 feet.

HALE AND NORCROSS.—Shipped to the Nevada mill during the week 937 tons of ore, showing an average value of \$19.49 per ton by pulp assays.

GOULD AND CURRY.—On the 200 level, the south-west drift has been extended 16 feet. Total length,

284 feet. Formation, porphyry and quartz, showing some value. On the 400 level the southwest drift has been extended 20 feet. Formation, quartz, showing some value.

NORTHWESTERN CON.—Shaft down 70 feet, the bottom in low-grade quartz.

WEST COMSTOCK.—Face of lower tunnel within 43 feet of the vein, which it will cut 400 feet below the surface croppings.

SAVAGE.—Shipped 445 tons of ore, battery sample assays showing an average value of \$22.37 per ton. Bullion on hand valued at \$5994 on January account.

CHOLLAR.—Crushed 420 tons of ore during the week, showing a pulp assay value of \$21.50 per ton. The 750 north lateral drift continues in low-grade quartz and 930 level north drift in quartz and porphyry.

POTOSI.—The 930 level east crosscut continues in quartz and porphyry. The 650 level east crosscut, No. 3, is in quartz.

NORTH GOULD & CURRY AND EAST BEST & BELCHER.—The west drift from the northwest drift is in quartz giving low assays.

IMPERIAL.—West crosscut No. 1 from the 500 level joint Confidence-Challenge drift is in quartz and porphyry. West crosscut No. 2 on the 300 level continues in quartz, showing bunches of ore.

YELLOW JACKET.—Daily ore shipments average 78 tons, battery samples showing an average assay value of \$21.75 per ton.

CONFIDENCE AND CHALLENGE.—The joint 300 level west crosscut continues in quartz and porphyry.

ALPHA.—The 600 north drift continues in low-grade quartz.

EXCHEQUER.—The 500 level east crosscut continues in quartz and porphyry.

WARD COMBINATION SHAFT.—The 1800 level east drift is advanced 169 feet.

OVERMAN.—Shipped 161 tons of ore to the Vivian mill during the week. Are preparing to stoop ore from the 1200 level.

NEW YORK CON.—Ore is showing in the lateral drifts from the raise above the 800 level.

EAST SIERRA NEVADA.—The 520 level south drift is out 604 feet.

CALEDONIA.—West crosscut No. 3 continues in porphyry.

CROWN POINT.—Shipped to the Mexican mill 764 tons of ore, showing a value of \$18.17 per ton by pulp assays.

BELCHER.—The 850 level east crosscut is in porphyry, showing streaks of quartz. The 600 level south drift is in porphyry. The 200 level east crosscut is in low-grade quartz.

SEG. BELCHER.—Ore is still showing in the 1200 level drift from the winze.

SILVER HILL.—Usual progress made in 160 and 260 level explorations.

JUSTICE.—Crushed 230 tons of ore, showing a value of \$23.75 per ton by battery sample assays.

UTAH.—On the 600 level the southeast drift is advanced 690 feet from the shaft station. Formation, hard porphyry.

OCCIDENTAL CON.—On the 400 level of fair quality is being extracted. On the 500 level, 70 feet south of No. 3 raise, an east crosscut is still showing bunches of high-grade ore. On the 550 level the line crosscuts are in quartz and porphyry.

NORTH OCCIDENTAL.—On the 550 level, joint east and west crosscuts at the south line of the mine are in porphyry and low-grade quartz.

Cherry Creek District.

ATTACHMENT.—White Pine News, Jan. 4: All the Merrimac company's operations in Cherry Creek have been suspended by the sheriff. An attachment for \$6000 has been levied on the property by the Union Iron Works of San Francisco. The miners will file their liens. Nothing more is likely to be done before spring, when the property will change hands. Cherry seems to be in a hard streak of luck.

Sylvania District.

SMELTER.—Virginia Enterprise, Jan. 10: A 40-ton smelter will be put up at the mines in Sylvania District early in the spring, and there are other evidences that a big business will be done there. A wagon-road is also being constructed to the mines.

Tuscarora District.

NEVADA QUEEN.—Times-Review, Jan. 10: North gangway from the 600-foot level of the North Belle Isle shaft has been advanced 28 feet. Rock hard.

NORTH BELLE ISLE.—The crosscut from the station, 300-foot level, extended 16 feet; ground is short and full of red slips.

BELLE ISLE.—The crosscut from the north gangway, 350-foot level, extended seven feet; rock very hard. The crosscut from the south drift, 250-foot level, continues without material change.

DEL MONTE.—North drift from east crosscut is in 17 feet, developing fine ore, assaying as high as \$136 per ton.

GRAND PRIZE.—Face of north crosscut from west drift on the 500 level advanced 11 feet, cutting numerous stringers of quartz.

NAVAJO.—No. 2 crosscut from south drift, 350-foot level, advanced 21 feet; face begins to show water and looks favorable. Upraise from south drift, 150-foot level, extended 9 feet, showing larger ledge of chloride ore. The mill cleanup has been completed.

NORTH COMMONWEALTH.—2d level: Joint crosscut has been advanced 12 feet. 3d level: Joint crosscut east extended 9 feet. Work has been suspended at this point, and drift started to open the ore cut 30 feet back from the face, which looks well. East crosscut from south drift extended 11 feet; face continues in low-grade ore, and shows some water.

COMMONWEALTH.—1st level: Winze from east crosscut has been connected with No. 14 chute, exposing a fine body of ore. South drift from No. 3 chute extended 16 feet, following the ore. East intermediate drift from No. 8 chute advanced 23 feet; face shows some low-grade ore. North drift from No. 5 chute is in 14 feet, two feet of good ore in the face. This drift is being pushed to the North Commonwealth line, 70 feet to go, 2d level: South stopes looking well as at any time heretofore. 3d level: South drift from No. 2 crosscut advanced 8 feet, exposing some good ore. Stopes just started at this point look well. 4th level: North gangway extended 11 feet; rock breaks very bad, causing slow progress to be made. The mill is running and doing good work. On account of having to get roaster bins filled, pans were not started until the 7th. The extreme cold and storms interfered great-

ly in starting, especially in repairing any brick work, but all is now running nicely. Battery pulp assay for the week, \$273 per ton; crude bullion on hand, \$8000. Seven hundred tons have been sent in the concentrator; crushed 550 tons; assay value, \$18 per ton; average assay of concentrates for the week, \$271.28 per ton.

ARIZONA.

CONGRESS.—Prescott *Courier*, Jan. 8: F. M. Murphy, superintendent of the Congress, has just come up from mill and mine and has the same news—both doing well. Quartz Mountain mill is running on rich gold ore from the company's mines. Now that Mr. Williams has come back, matters will be pushed on Big Bug and at the Senator. A Phoenix paper of recent date stated that there was a carload of unusually rich silver ore from Tip Top district, this county, at the store of J. Y. T. Smith, en route to the smelter at El Paso, Texas. Placer miners are sending in considerable gold.

ORE TO SHIP.—Mohave *Miner*, Jan. 11: There are between 150 and 200 tons of ore awaiting shipment from the various camps. Until the stormy weather subsides the ore teams will remain tied up. The crosscut tunnel being driven on the Little Boy mine is yet some distance from the ledge, and, owing to the nature of the ground, slow progress is being made. N. C. Amer recently had a shipment of high-grade ore from the Silver King mine worked at the sampler, Martin Jimenez and Juan Garcia have four men to work on the Goldback mine near Chloride. They are getting some good ore from the main shaft and will continue sinking for the present. T. Myers, lessee at the C. O. D. mine, had between 5 and 6 tons of ore worked at the sampler, which gave a result of 314 ounces silver per ton. Dan McKinnon and Geo. Koster are working the Altata mine with very good results. They have a carload of very good ore ready for sacking and shipping. The ore carries considerable copper and will be shipped to Argo for treatment. W. B. Campbell is working the ore from his gold mine in the Twins' wash, near Cerbat, by arastra, with fine results. The ore is very free, while the gold is coarse. The pay streak has grown to a width of 10 inches and much of the ore will be shipped. A whip has been erected at the main shaft of the Tuckhoe mine, Chloride. At last accounts they were down 90 feet, with 10 inches of ore that will average 350 ounces silver and 1½ ounces gold per ton. The new shaft at the Sunset mine has collapsed. The shaft had attained a depth of 95 feet, but it was sunk to a wash carrying much water during rainy weather, and the recent rains soaked through and caused the cave. Supt. Mackenzie has about 25 men employed at the Cupel mine and the ore body continues to grow both in quantity and quality.

GLOBE DISTRICT IN 1889.—*Silver Belt*, Jan. 4: The year 1889 was a fairly prosperous one for the mining industry of Globe district; the production of both silver and copper will show a considerable increase over that of the previous year, and the outlook is bright for a more successful season in 1890 than we have enjoyed for many years. A. L. Walker, superintendent of the Old Dominion Copper Co., has kindly furnished us with the figures representing the output of copper by his company during the past year, viz., 5,915,570 pounds, as against 4,600,000 pounds in 1888. This is certainly a fine showing for the Old Dominion Co., and the value of their mine, the Globe, is better appreciated by those who recently had access to the underground works, and ocular proof of the extensive ore bodies in sight, sufficient to supply the smelter with ore through the current year, and developments now in progress and contemplated will increase the ore supply and facilitate its extraction. With an active copper market, a liberal supply of coke on hand and the probability of an open winter, there is every reason to hope that the Old Dominion Copper Co. will enjoy a continuous and prosperous run.

BRITISH COLUMBIA.

AMERICAN MINING MACHINERY WANTED.—*Kamloops Sentinel*, Jan. 4: So much has been said and written one way and another, regarding the necessity of placing mining machinery on the free list, and the arguments advanced in favor thereof have been so potent, that little more remains to be said on the subject. However, the importance of the subject is our only excuse for referring to it in this number, and that it is important can easily be gleaned by a perusal of the reports from the different quartz-mining sections of the province as they appear in this issue. There can be no two opinions regarding the great drawbacks the mining industry of the province suffers on account of the heavy duty on mining machinery. The majority of the ores of British Columbia are of a refractory nature, and special machinery such as is not manufactured in the Dominion is required for their reduction. To purchase this machinery in a foreign country and then pay the enormous duty fixed by the Federal Government is imposing a double burden on the miner, a burden he is in many cases unable to shoulder, and consequently his claim must remain undeveloped. With the knowledge of this fact in their possession we cannot understand why any delay should be made by the Government in deciding on this important subject. But another phase of the question presents itself. Already the plant for two smelting works has been imported into the province and the duty thereon has been paid. Another company has purchased plant for a smelting works, which has remained in the hands of the manufacturer for about a year. The company has been led by certain matters under consideration to leave the plant where it is. And probably not among the least of these considerations was the desire to await the action of the Federal Government in placing such machinery on the free list. If so, and the Government should, before they decide to bring in the machinery, strike off the duty, then it would be no more than a simple matter of justice to refund to those companies which have imported plant and paid duty thereon, the amount so paid. The duty must come off mining machinery, and to be consistent the amount of duty already paid must be refunded.

COLORADO.

LOCATIONS.—*Georgetown Courier*, Jan. 9: The records show that during 1889 there were 473 mining claims located in Clear Creek county, or a pre-emption of some 2365 acres of mineral-bearing

lands. A location in 1889 doesn't mean what it did in 1869—then if a man discovered mineral indications, he put up his stake and his neighbors who could afford a shingle and pencil proceeded to locate Nos. 1, 2, 3, 4, etc., both west and east up to 20; now it means a survey, the sinking of a shaft 12 feet from the lowest rim and the disclosing of a well-defined crevice. It costs at least \$100 to do the simple location work and it is fair to assume that at least \$200 has been spent on each new location, so that in new work alone we have spent about \$100,000 in mining, on new ground.

THE GOLDEN FALCON.—The Falcon lode, Morris district, worked by George Mills & Co., has a body of gold ore, that, with a stamp-mill near by, could be made one of the largest producers in Clear Creek county. The value of the ore body has been determined by a mill-run of 30 tons, which averaged an ounce gold per ton.

THE COMET'S BIG VEIN.—The recent strike on the Comet mine is in the old east shaft at a depth of about 65 feet. The lessee, Mr. O'Mallie, has run a drift west from the shaft about 15 feet through a 12-foot vein lode material, indiscriminately mixed throughout with rich ore, the entire 12 feet being taken out and sorted.

LEADVILLE'S PROOUEURS.—*Denver Republican*, Jan. 9: The difficulties existing between the Marian Mining Co. and the lessees on the properties owned by this company, have been amicably adjusted. These difficulties having been so satisfactorily settled, the company assumed the entire control of all the ground belonging to them, and are now in full possession, and intend to work some of it themselves. Mr. Havens, acting for the Marian Co., has granted a new lease to the former lessees of the Devlin, another of the company's properties, for a long term, the lessees being Dr. Galloway, of our city, and a number of others. The strike in the Lucy B. Hussey having demonstrated the fact that in order to get at, develop and handle the ore from the new chute to advantage, a new shaft must be sunk, with the customary promptness of the management of that property, surveys were made and a contract let for the sinking of such a shaft, pending the reaching of the ore body, by which shaft all work, apart from keeping the old workings free of water, was abandoned, and all the force employed at the new shaft. The encountering of this chute by the Lucy B. Hussey is without doubt one of the most important events we have had to chronicle for a long time, and we shall anxiously await the reaching of the ore body by the new shaft and the subsequent development of the chute. Mr. George Kruger of the Tip Top mine returned to Leadville after an absence of some eight months in Europe, and the mine has now closed down for repairs to machinery, but will be started up again and work resumed on the entire ground as soon as the necessary repairs are effected. The shipment of ores from this mine has increased very materially lately, the average amount per day being something over 30 tons.

HUNTER PARK M. CO.—*Aspen Times*, Jan. 10: The Hunter Park M. Co. has got its shaft down 540 feet on the Montgomery group in Hunter park and has just let a contract for another 100 feet. The shaft is still in the blue lime, but it is expected that the present contract will carry it to or very near the contact. This company is amply supplied with funds for prospecting its property.

ON MILLER CREEK.—Gus Carlson and his partner have been sinking a shaft on the Snow Fall claim on Miller creek and have gone down about 40 feet.

THE EDISON.—Manager Murphy of the Edison reports that he has 100 tons of ore on the dump ready to ship. This will be sent down to make room for what is being broken in the mine. The property is certainly improving, although the ore is not now as high grade as it was a few days ago.

LOW-GRADE DRY ORES.—Mr. Charles Driver, manager of the Driver Public Sampling Works, has succeeded in securing a new schedule of prices for low-grade dry ores, which will enable the miner to ship 25 and 30-ounce ores at a profit. Many mines can now increase their output. This outlet for low-grade dry ores running from 25 to 40 ounces per ton, will materially increase the prosperity of the camp.

DAKOTA.

SYNDICATE SMELTER.—*Deadwood Pioneer*, Jan. 8: The plant was not blown in yesterday, as had been intended, but fires will probably be lighted today or to-morrow. The run, to be of two weeks' duration, will be on ores from several Bald Mountain and Ruby Basin mines.

REDUCTION WORKS.—Everything moves smoothly at Col. Carpenter's reduction works. Carpentering is nearly complete, and repairs to machinery are all but finished. The plant will probably be ready for business by the 20th of the month, and started for its initial run not later than February 1st.

IDAHO.

THE TIP-TOP MILL.—*Wood River Times*, Jan. 8: The new Huntington mill at the Tip-Top mine, on the Gold Belt, was started up for the first time Christmas Day. The mill was in first-class running order within 24 hours from the start, the only thing about it needing regulating being the tension of the belts. Ole Rorem was in Hailey last evening, and being asked how the mill was doing, replied: "We are grinding out gold night and day; two hundred dollars worth every 24 hours, and at an expense of only \$60 a day. We have 14 men at work and will keep the lick up all winter." Only one Huntington mill is in operation, as they were only wanting to make a test. There is plenty of ore in sight to keep half-a-dozen such mills in motion indefinitely.

SOFTER GROUND.—*Ketchum Keystone*, Jan. 11: It was reported a few days since that the parties running the Elkhorn tunnel had encountered soft ground and indications of quartz and iron. When it is remembered how slowly this important work has been going on for a long time, owing to the hardness of the formation encountered, the discovery of soft ground—and the consequent reason for expecting more—is regarded with no little satisfaction by those interested. In fact, the whole community is interested.

AN IMPORTANT SALE.—*Owyhee Avalanche*, Jan. 11: Capt. J. R. De Lamar of De Lamar, Idaho, is the purchaser of the two-thirds interest of Christian and Louis Wahl, in the Wilson, Chicago, Christian

Wahl, Louis Wahl, Phoebe Grace, Eva and Pharaoh mines, together with millsites, water-rights and tunnel-sites, situated near De Lamar, Owyhee Co. The price paid was \$500,000. Nearly every one is glad that the Captain purchased the property, because to him more than any one else is the development of the rich mining camp near De Lamar due. The property is well worth the price paid for it. The Captain will at once enlarge the mill, so we understand, to the end that he may reduce 100 tons of ore per day instead of 50.

LOWER CALIFORNIA.

NEW PLACERS.—*San Diegoan*, Jan. 4: As predicted, the rains are bringing new placer finds to light, and from now on rich strikes may be expected in the vicinity of Alamo, as well as in places not yet prospected. The strike reported last week at Mexican gulch, where two men took out \$200 in one day, brought many miners over from Alamo, and several discoveries were made. Three new ledges, named the Northern Belle, Las Dos Esmeraldas and Las Flores, have been denounced, all of them situated near the new discovery. The quartz is almost entirely decomposed, and some of the dirt yields \$2 to \$5 a pan. It is claimed that the quartz will run \$1500 per ton, but this must not be granted till it is proven. The new veins are about four feet wide and have every indication of holding. They run directly north and south. W. S. Kerr, who is interested in the Lane mill at Alamo, has ordered another mill of the same pattern (Wiswell) which will arrive from S. F. on the Newbern next month. It will be set up at Alamo.

INTERNATIONAL CO. WORK.—The International Co. is receiving bids for going ahead on the Princess, and also other mines, to do the work required by law on mines to which possession has been given, which is equivalent to sinking a shaft 50 feet on each mine. This will result in putting a good number of men to work who are now idle. Free milling ore will soon be taken out of the Princess at 70 feet for immediate milling, while the work will still proceed at the 100-foot level in this mine, where the ore consists of sulphurets of iron, rich in gold. Lane's mill is running in full blast and will soon be inclosed with a new building. A 25-pound rock, full of free gold, from La Flor mine, eight miles southeast of Alamo, owned by the Frenchmen, has been on exhibition at Alamo, and excited no little admiration.

AT REAL DEL CASTILLO.—At the Real del Castillo, work is still progressing on the Accidental tunnel, and it is expected that the ledge will soon be struck. A. Morales has bought a new pump which he will put up at the San Nicolas. The Chinese have been hindered by the rains from finishing the Masac flume, but it is being hurried to completion. Gold has been found in placer and quartz on Tanama mesa, near Tecate, about 70 miles northeast of Ensenada. The Florentina (placer) and Fortuna (quartz) have been denounced by Juan B. Morales and Jose Bustamante.

MONTANA.

MOUNTAIN VIEW ORE.—*Inter-Mountain*, Jan. 8: The worst experience thus far encountered at the Mountain View mine is the hauling of its ores to the smelter in Meaderville. The teams have now already all the roads so blocked with piles of ore from break-downs and the wagons sliding around that it has become almost impossible for them to navigate. Wagons have to be exclusively used, as sleds cannot be brought up into the concentrator, so wheels must be entirely resorted to as means of locomotion. This year will end all this trouble, as it is the intention of the company to build the branch from the Montana Central to the mines on the bill, the property of the company.

MAGNA CHARTA.—The drifts in the Magna Charta on the 300 and 400 are being put in condition to commence the stoping of ores at these points, more especially in the northeast. Ore has been taken all the way from the 700 to the surface and as much remains in sight as already abstracted, with considerable ground yet to prospect. The mill of the Alice company, of which the Magna Charta is a part, is pounding away steadily on ores taken out of both the Alice and Magna Charta mines and is doing no custom work at all. At the Blue Wing a few men are working, placing the mine in a position to produce ore, of which there is a known amount in sight without taking into consideration the ground that is not yet opened up. The Mountain Consolidated shaft is 550 feet in depth and ore is being produced from every level in the mine. There are no reports of new strikes to make, as for some time past it is known they have a body of ore, copper in character with a sprinkling of silver, second only to one mine in the camp. From reports circulated it is learned that it is the intention of the Colorado company to sink the Gignion to the 1000-foot level which is on an incline. A new pump was purchased yesterday for the Mountain Lion company, size 5½x3¼x7. The Acquisition has again been started up by an Armstrong hoist. There have always been favorable prospects in this mine, but the lessees do not seem to make it stick. It changes management often.

NEW MEXICO.

THE SAVAGE MINE SOLD.—*Kingston Shaft*, Jan. 8: We are glad to announce that the sale of the Savage mine and Savage fraction, which has hung fire some time, has at last been consummated. We are informed that the deed in escrow calls for \$65,000, and that considerable money was paid down. The sale was made on Dec. 20th, but was not completed until Jan. 1st. Horace McChristian was the lucky purchaser and we are informed that he is more than pleased with his bargain. The final payments will not be made for six months unless Mr. McChristian so desires, but it is presumed that he will make them much sooner, as the property is in reality able to bring that amount of money at any time. A force of men was placed at work upon the mine on the 3d inst., and the force will be increased as fast as room can be found to work them.

STEIN'S PASS.—*Lordsburg Liberal*, Jan. 11: Bob Williams was in from Stein's Pass yesterday. He reports the camp in a flourishing condition. Recent prospecting indicates that big values are to be found in the ledge to the south. Winters & Kimball are taking out plenty of high-grade ore. The

more work that is done in the Bachelor the better it looks. Sam Meeks writes that he has bonded his half interest in the Patchlock, Volunteer and Coon to John F. Miles. It is reported that the Volcano is about sold.

OREGON.

THE DOLLY VARDEN SOLD.—*Bedrock Democrat*, Jan. 8: The *Democrat* has been informed that the Dolly Varden mine in Sparta district, owned by Capt. E. M. White and others, has been sold to the Bowick Bros., representing a large English syndicate, the sale being consummated in Portland. The company purchasing this property are also the owners of the Monumental mine in Granite district, under the name of the Oregon Gold M. Co., Limited, of London, England. The Dolly Varden is said to be a good buy, and included in the purchase are several other mines adjacent to that property, forming a group of gold-bearing mines that will certainly yield a large output when properly equipped with suitable machinery. The sale of this property means the erection of a large milling plant and the result will be of great benefit to the whole district for miles around.

MINES OF GRANITE.—*Cor. Bedrock Democrat*, Jan. 8: Many new discoveries were made up in the Greenhorn mountains and all of that section give excellent promise of being a great bullion-producer in the near future, as soon as the proper milling facilities are supplied. Mr. Henry Cable has worked quite a number of batches of ore from the Columbia mine, adjoining the E. & E., and obtained in every instance from 95 to 97 per cent of the assay value by chlorination. Up at the head of Cracker and Fruit creeks some fine developments have been made during the past season, and you will hear some good news from Mr. Kinsey's property up there next year. At Cable Cove work is being pushed on the Miner claim, and there are at least 20 locations that will give a good account of themselves as soon as there are milling facilities. Over at the La Bellevue group of mines the concentrating works are turning out concentrates averaging \$300 per ton, faster than teams can be had to haul them to the railroad at Baker City. Here is the grandest mine in all this section of country. Two tunnels of 800 feet each show a compact body of ore from three to ten feet in width for the entire distance, and not an ounce of waste in any portion of it. The La Bellevue has paid from the grass roots down, and the ore is better in the lower tunnel than on top. The ore taken from the tunnels and winzes have paid for all the work done upon the mine, and have been shipped more than 1000 miles to the reduction works, and not a ton of ore has stopped. Is it not a good showing?

UTAH.

TINTIC DISTRICT.—*Salt Lake Tribune*, Jan. 12: When snow came it blocked everything. This has caused the Mammoth to lay off part of its force, because there was no storage room left for ore, all the bins and some of the old stopes being full.

CASTLE VALLEY COAL-FIELDS.—Union Pacific officials have been looking over the Castle Valley coal-fields with a view to opening up extensive mines there.

THE HORN SILVER.—At Frisco the Horn Silver is making its regular shipment of about 1000 tons of ore per month, such as net the company about \$30 per ton. During the past year this mine sent out a little over 12,000 tons of ore. They have in sight fully 18 months' work of similar ore in the mine, but it is not shipped separately, it being found best to mix it with the low-grade ore. The company employs about 100 men. During the past year, under the superintendence of Hon. P. T. Farnsworth, there was paid a dividend of \$50,000 and a surplus fund of \$20,000 was created, besides loaning \$200,000.

THE CACTUS CO.—The Cactus M. Co.'s property in Copper gulch, near Frisco, is being operated to some extent by the Comet Smelting Co.; also a French organization having a lease on the Cactus mines. After several months of inactivity they have put a few men at work.

COPPER CLAIMS.—The French company owning some copper claims a few miles northwest of Milford are working a small force there in developing their property.

IRON DEPOSITS AT TINTIC.—Parties at Provo owning valuable iron deposits in Tintic, which they have been developing for years, and have in vain tried to start a furnace and foundry to use this iron, have had their hopes brightened the past few days. Outside capital is seeking a location for a stove foundry, and learning of these iron mines have made a proposition for 20,000 tons of pig iron during this year. They are rustling for a local organization and funds to embark in making pig iron, and if successful will get a furnace in blast as soon as possible.

PARK NOTES.—*Record*, Jan. 11: Last Tuesday morning the Nevada-Northland leasers brought into the leasers' workings in the Mayflower No. 7, and what will be the outcome can only be conjectured. It is alleged by the Nevada-Northland people that the Mayflower have been working in and extracting ore from their ground, and to confirm this suspicion they drifted and then sank to connect with the Mayflower workings. When but a thin space of ground remained between, a small hole was broke through which gave an opening. Each side is determined and it looks like the fight for possession of the valuable and disputed ground will find its way into court.

CRESCENT'S UPPER WORKS LEASED.—*Messrs. Chas. H. Gitsch and Richard Campbell* have secured a five months' lease, dating from January 1st, and paying a royalty of one-sixth on the output, on all the Crescent Mining Co.'s property above the A'na tunnel.

GOOD NEWS FROM THE M'CUNE.—The hard formation which the McCune tunnel has lately gone through has proved to be the footwall of a big and well-defined ledge, so they have started work drifting on it.

ORE AND BULLION SHIPMENTS.—During the week the Mackintosh sampler received and forwarded 545,140 pounds of Ontario ore; 294,630 of Mayflower No. 7 leasers'; 272,470 of Daly; 78,750 of Alliance; 76,980 of Woodside, and 34,430 pounds of Nevada-Northland leasers' ore; total, 1,302,400 pounds. The Ontario bullion product for the week was 35 bars containing 21,247.86 fine ounces of silver.

MECHANICAL PROGRESS.

The Foundry.

The Requirement of Modern Times—The Apprentices System.

The use of machinery has been attempted in the foundry, but its successful application has been very limited, being confined to a comparatively few classes of castings; therefore the progress made has not been the result of improved machinery so much as the general attention to the details of the work and the greater knowledge of the principles of the foundry work by the majority of the men employed in it. To the foundrymen whose names are connected with the foundry literature of the present time is due a great deal of credit in considering the progress made in foundry work during the past decade; men who, in addition to the cares of the management of a foundry during the daytime, have taken upon themselves the extra labor of furnishing molders food for thought and new ideas for practice through the columns of mechanical papers.

That there is abundant room for greater progress in foundry work, those who are most intimately acquainted with the art of founding unhesitatingly admit. How is this progress to be brought about?

It is to a great extent in the hands of the foremen and proprietors of foundries, as well as the molders themselves.

The duty of the molder in helping onward the progress in foundry work is to improve himself in the intricacies of his trade by careful observation and study, while the duty of the proprietor and foreman is to make better molders, men who are better qualified to represent the trade in the mechanical world.

We undoubtedly have in our ranks some men who are just as good mechanics as can be found in the ranks of any trade, but we also have men who travel about the country under the name of molders who are only a disgrace to the trade. There is a remedy for this state of affairs, and the remedy for this evil rests entirely in the hands of the proprietors and foremen. I would suggest (after a careful study and a thorough knowledge of the requirements of the case) a change in the apprenticeship system in vogue in most foundries at present, in which every Tom, Dick or Harry gets a chance to "learn the trade," and after an apprenticeship of perhaps three years is launched upon the mechanical world as a molder. In nine cases out of ten, when such a molder (?) secures a job in a strange shop, his ability is soon gauged, and he is kept at work on the poorest class of work, as there is no money in him on good work. He soon tires of such a job and makes a change, only to find the same program prepared for him, and such is his life, traveling from one shop to another, but never getting a step higher in the knowledge of his trade. Of course there are exceptions to this rule, but it is safe to say I have outlined the result in a great majority of the apprenticeships of to-day.

We want and should have a more strict apprenticeship system, one that will insure the trade a good mechanic, and the apprentice a fair knowledge of his trade when he enters the mechanical world as a journeyman molder. I would suggest that each apprentice be indentured for at least five years, at a salary which will at least support him, yet be low enough to allow the employer to do his duty by the apprentice, without loss.—*J. P. Pero, in The Tradesman.*

A PNEUMATIC TIRE FOR BICYCLES.—A pneumatic tire for bicycles has been invented in Belfast, Ireland, which, if all that is claimed for it is true, must mark a new era in this method of recreation. The tire for a full roadster is about two and one-half inches in diameter, and is composed of an outer covering of rubber, graduated in thickness from about a quarter of an inch, where it touches the ground, and protected by canvas, where it is attached to the rim, which is very broad and nearly flat. Inside this outer covering is an inner tube, which contains the air. The air is pumped in with a foot-hall blower, and a patent air valve prevents its return. Vibration is practically annihilated. It is intercepted between the rim and the ground, and consequently the frame receives no jar except when an unusually large hole is encountered. A frame so protected should wear out two frames with solid tired wheels; and not only so, but riders will be able to use very much lighter frames without any danger of their collapsing. In a recent fifty-mile road championship, in the Phoenix Park, Dublin, one of the competitors rode a racing safety, fitted with "pneumatic" tires, and scaling only 23 pounds, and yet it passed through the ordeal—an ordeal trying even to the heaviest makes—without the slightest damage. Anti-vibration, luggage and camera-carriers and spring lamp brackets are quite unnecessary, and the complete absence of noise puts the finishing touch to the comfort and enjoyment of the rider.

A MACHINE MUCH NEEDED IN MILL WORK. A machine for cutting up round or flat iron and steel, and much needed in mill work, has been invented, says the *Rockville, Conn., Journal*. It cuts round iron or steel, from one-quarter to one-half inch, and flat up to quarter inch, as easy as one cuts a piece of card with pocket cutters. There is an opening for each size of round while a drawing shear cuts the flat. There are several unique movements and

points in connection with the machine which must be seen to be appreciated, especially the return of the blade after a cut has been made, and which is made without any springs to offer any resistance to the cutting motion. A great advantage and saving of time results from the finished manner in which the work is left after the cutting.

CUT VS CAST GEARS.—Cut gears run smoother than cast gears, and gears that have their teeth set on a skew run more quietly than those on square across, but there is a form of a tooth on the slant known as the herring bone, that no one ever attempted to cut on a milling machine until a gear-maker discovered that they could be cast in halves and bolted together after the teeth had been snagged on a gear-cutter. It was claimed that the strength by braising against each other was not impaired if the wheel was driven in the right direction, and where strength alone is not the vital point the space on one side can be made to match with the teeth on the other, and in this way get the best condition for a smooth-working gear.

THE COMPOUND ENGINE.—To what an extent facts gathered from experience will overturn theory is well seen in the instance of the compound engine. It is but a few years ago that the utility of the compound engine in mills was opposed by most of the engineers in this country. Now it looks as if in a few years the simple condensing engine for large power would be a curiosity. And as the practice of compounding comes to be better understood, it is extending to small sizes. Higher steam pressures and compounding are having an important influence in reducing the cost of motive-power.

THE MANUFACTURE OF SPIKES.—Experiments of an encouraging character have been made in the manufacture of spikes, with a view to making a finished article by rolling the bar so that its width shall be the length of the spike, and in such shapes that the spikes may be cut from it with shears, similarly as a nail is made, except that the head is made in the rolling process. In tests made by running through some steel nails that had been slowly heated for 2½ hours, the result showed that with some change in the working mechanism the operation was entirely practicable.

LARGEST LOCOMOTIVE EVER BUILT.—The largest locomotive ever built has been ordered by the St. Gothard Railway Company of J. A. Maffei, of Munich. It will be a large double compound tender-locomotive on the Mallet system. The service weight will be 85 tons, and the engine will run on six axles coupled in two motor groups. In Stephenson's time the railway locomotive engines weighed only about seven tons. Now the heaviest type of the ordinary express engine weighs about 50 tons.

ALUMINUM IN THE MANUFACTURE OF SHIP PLATE.—Aluminum is developing its value in another field of usefulness—the manufacture of ship plate. A plate in which ten per cent of it is used possesses great strength, will take a high polish, and is absolutely proof against the corroding action of sea-water and the adherence of barnacles, sea grass, and other similar matter. Gun-barrels made of this alloy will not rust.

A NEW FASHIONING MACHINE.—A successful experiment in the operation of a ponderous 14-ton machine, built to fashion steel railroad ties, was made at Pittsburgh last week. The machine was set in motion at the mills of Carnegie, Phipps & Co., and from a three-quarters of an inch steel plate finished ties were turned out at the rate of 80 per hour.

THE NEW FORM OF SCREW, which has recently been brought to notice, as a half nail and half screw, involves in its use two blows of the hammer and two turns with a screw-driver. Its holding power in white pine is said to be 332 pounds against 298 pounds, the holding power of a screw of the same size made after the usual manner.

THE ROTARY SNOW FLOW, introduced upon the railroad this winter, works admirably. It goes through the deepest snow which has fallen this winter without any trouble whatever, dashing the snow through the hopper 150 feet away from the track.

A STEEL RAILROAD TIE.—Gen. Lew Wallace, well known as the author of "Ben Hur," has invented a railroad cross-tie, which, some railroad experts think, may be of more pecuniary benefit to him than even his famous work of fiction.

THE FUTURE MAN-OF-WAR.—The Italian Admiral Albini thinks that the future man-of-war will have double screws and a helm at each end, so that in battle it need waste no time in turning around. Its sides will be unarmored.

THE NEW RAILROAD LAW.—A requirement in the proposed railroad law calls for the payment of mileage on all cars belonging to private companies or individuals—a very reasonable requirement.

PIO IRON.—It will be news to many that the consumption of pig iron in this country is greater than in Great Britain, but it was in 1886 and 1887, and is again this year.

SCIENTIFIC PROGRESS.

Sulphur in Refining Sugar.

A good deal of sulphur is used in the manufacture of sugar, and in no country in the world is it employed to a greater extent than in Louisiana, says the *Grocers' Criterion*. Sulphur is applied to cane-juice in the form of gas, and it makes the product, both of sugar and molasses, lighter and brighter in appearance, planters claiming that it enhances the value from three to five cents on molasses, and that the sugar has a brighter color and requires less washing to produce the same tone. The method generally adopted is to burn sulphur in a small brick oven. The fumes of the sulphur are carried by a pipe into a harrel of water, and the sulphurous gas coming in contact with the water is cleaned from sulphuric acid. The fumes thus purified pass from the harrel by means of a pipe into the sulphurizing-chamber which is constructed of wood in such a manner that the juice is constantly coming in and going out, and an arrangement is made so that the juice will fall in the form of rain or spray, the effect being to bleach out the coloring matter contained in the juice.

Some manufacturers claim that a great deal of the sugar is destroyed by coming in contact with the sulphuric gas which contains a considerable quantity of sulphurous acid, and that by a little carelessness in applying this acid to the cane-juice thousands of dollars a year have been lost in the larger manufacturing. The question has been raised and discussed largely by scientists and pure-food men as to whether the sulphur affected the sugar so as to make it injurious to health, some claiming that it does and some that it does not. Where so many doctors disagree, it is extremely difficult to determine whether bleached sugar is harmful or not. The existence of sulphurous acid in molasses is what causes it so often to corrode metal vessels of various kinds with which it is brought in contact. It may be taken for granted that any substance that would corrode an iron pan or a copper kettle is hardly fit for human consumption.

SEED OF FISHES.—The speed of fishes is almost an unknown quantity, it being, as Prof. G. Brown Goode says, very difficult to measure. If, says the professor, you could get a fish and put it in a trough of water 1000 feet long and start it at one end and make it swim to the other without stopping, the information could be easily obtained; but fish are unintelligent and will not do this. Estimates of the speed of fish are consequently only approximated, and more or less founded upon guessing. One can tell, however, at a glance whether a fish is built for speed or not. A fast fish looks trim and pointed like a yacht. Its head is conical in shape; its fins fit down close to its body, like a knife-blade into its handle. Fish with large heads, bigger than their bodies, and with short, stubby fins, are built for slow motion. The predatory fishes, those that live on prey, are the fastest swimmers. The food fishes are, as a general thing, the slowest, and consequently are easily captured. Their loss is recompensed, however, by the natural law which makes them very prolific in reproduction. Dolphins have been known to swim around an ocean steamer, and it is quite safe to say that their speed is 20 miles an hour; but it may be twice as much. The bonito is a fast-swimming fish, but just what its speed is, is not known. The head of the goose fish is very large, 20 times as big as its body. It moves about very little, and swims at the bottom of the ocean. The Spanish mackerel is one of the fastest food fishes. Its body is cone-shaped, and is as smooth as burnished metal. Its speed is as matchless as that of the dolphin, and in motion, it cuts the water like a yacht.

THE PRESSURE EXERTED BY SEEDS.—Mr. Grehant has recently made known the results of some experiments undertaken for the purpose of comparing the pressures exerted by seeds placed in a closed vessel in a current of water. The apparatus used consisted of a small Papin digester of cast iron, having a capacity of 45 cubic inches, and provided with a tight-fitting cover held in place with screws and nuts. The vessel was filled with seeds up to the middle, then there was introduced in the center a rubber bag one inch in diameter filled with mercury, into which entered a glass tube at the top. This tube, which passed through the cover, served as a compressed air gauge, while a brass tube extending to the bottom also traversed the cover and served to introduce the water that had to be removed. Finally the vessel was filled with seeds and closed. With lupin seeds, Mr. Grehant found that the pressure rose to 15 atmospheres. Upon opening the apparatus he found the seeds very strongly compressed against each other, there being not the least interval between the flattened surfaces. When lentils were placed under the same conditions, the pressure did not exceed eight atmospheres.

THE PHONOGRAPH'S RIVAL.—M. Leon Esquima, a Mexican, it is stated, has perfected a marvelous invention in electricity and photography. By speaking in a photophone transmitter, which consists of a highly polished diaphragm reflecting a ray of light, this ray of light is set into vibrations and a photograph is made of it on a traveling band of sensitized

paper. Now comes the wonderful part. If the image of the photographic tracing is projected by means of an electric arc or oxyhydrogen light upon a selenium receiver, the original speech is then heard. It is evident that there is no limit to the development of this peculiar combination of methods. This is very important, if true.—*Popular Science Monthly.*

A LIGHT THAT BRINGS OUT ALL THE COLORS OF A PICTURE HARMONIOUSLY.—Thomas A. Edison's latest achievement is the invention of a light by which pictures may be seen at night with nearly all the advantage of daylight. Electric lights have heretofore thrown either too brilliant a light or too yellow a light. Edison has secured a perfect light for pictures by placing at the back of the bulbs in his system of lighting a lead piece covering half of the bulb and fitting it closely. Inside of the bulb is a coating of silver. The yellow of the light and the silver reflection make a light that brings out all the colors in a picture harmoniously. It was first used in the illumination of the Angelus in the Barye collection.

PAINTING IN SAND.—A PRETTY NOVELTY.—Parisians have been entertained by a remarkable artist who displays wonderful skill in her peculiar form of painting. With plates of various-colored sand before her, she takes the sand in her right hand and causes it to fall in beautiful designs upon a table. A bunch of grapes is pictured with violet sand, a leaf with green sand, the stalk with brown sand and relief and shadows by other sands, when the work is brushed away, and a bouquet of roses and other objects are represented with the same dexterity and delicacy. Lines are drawn by the stream of sand as distinct as though made with an artist's brush.

A NEW WHITE PITCH FOR SHIPBUILDERS has been introduced, which, it is said, supercedes the present laborious, expensive and inefficient method of forming white deck seams by working putty into the seams with a knife. The peculiarity of the white pitch is that it is the only material hitherto introduced of a white color that can be run into deck seams in a hot state like ordinary pitch. The material is especially suitable for hot climates, as it will stand a sun heat which would cause ordinary pitch to melt out of the seams.

THE LOTUS AS A TANK-PURIFIER.—*Indian Engineering* states that a large basket of the roots of the lotus has been received by the municipality of Bangalore from Tanjore, and is now being planted out in the beds of the tanks in the station. This aquatic plant is one of the best water-purifiers known. It rapidly oxygenates the water, and ridding it of its dead organic matter, brings it into a healthy condition. The presence of such like aquatic plants in reservoirs is said to diminish evaporation.

SCIENCE PRIMERS.—The American Society of Naturalists, at their recent meeting in New York, appointed a committee to prepare a plan for the publication of a series of science primers. A resolution was also adopted recommending to colleges the addition of natural science as a requirement for admission, and asking the colleges to make a change, even if it necessitated a reduction in the amount of classical knowledge required.

PRESERVATION OF MILK BY ELECTRICITY.—M. Maissonhaute, says the *Bulletin International de l'Electricite*, having noticed that the passage of a current of electricity through milk retarded the formation of cream, made a series of experiments to see whether milk could be kept fresh in this manner. The result of these experiments is a patent for the preservation of milk by means of either static or current electricity.

DRY OXYGEN.—The scientific world seems to be very much surprised at the late discovery of Mr. Bereton Baker of Dulwich College, about oxygen. That gas, which is known as the great agent of combustion, loses its character when dried. It becomes inert. Even charcoal will not burn in it when heated to redness, nor phosphorus become luminous. As yet there is no explanation.

ALUMINUM CASTING.—A gentleman in Philadelphia has been making some very successful experiments in casting aluminum. He has ascertained that it is possible to obtain exceedingly good results by the use of brass or iron molds, faced with plumbago.

NITROGEN AND PLANT COLOR.—A French chemist believes himself able to tell whether soil is deficient in phosphorus, potash or nitrogen by the shade of green of the vegetation. The leaves become yellowish when nitrogen is lacking.

FROZEN SIXTY FEET DEEP.—Siberia is said to have a spot of ground about 30 miles square that has not thawed out for a hundred years, and is frozen to a depth of 60 feet.

COCOA BUTTER.—German chemists have discovered in the cocoanut a fatty substitute for butter, and this new product has begun to be manufactured on a large scale.

GOOD HEALTH.

"La Grippe."

The Russian influenza, "la grippe," or by whatever name it may be known, is nothing new. Indeed, it is very ancient, for it dates back as far as 1510. Dr. John R. Hamilton of New York, a well-known and accepted authority on all matters pertaining to the laws of health, and on the subject of "la grippe," says the disease has made periodical visitations during the last few hundred years. It spares no part of the world in its pilgrimages.

The earliest recorded epidemic of influenza is that of 1510. There were 20 visitations of the disease, which is also known as epidemic catarrh, between 1510 and 1837. The disease does not confine itself to men, but frequently affects the lower animals.

A complete history of the disease was published under medical authority in England in 1852. Among the articles in that work was one by Dr. John Warren of Boston, written in 1790, from which it appears that influenza, then well known in Europe, invaded the whole of the United States in the course of the autumn of 1789.

What It Is.

Dr. Albert Robin of the Paris Académie de Médecine says: "This disease is known as 'influenza,' or more commonly in French, as 'la grippe.' Unquestionably the epidemic will continue to spread—how far it is impossible to say—but there is no occasion for serious alarm. An ordinary case of influenza has nothing more to be dreaded than a severe cold of a week's duration.

Its Symptoms Are Unmistakable.

"Headache, pains in the eyes, soreness all over the body, as if one had been beaten, loss of appetite, a feverish condition, and a general sense of lassitude and discomfort. These general symptoms are apt to be followed by various local troubles, such as a bronchial attack, a cold in the head, sore throat, diarrhoea, and sometimes by pleurisy or pneumonia.

"The only real danger is presented in the last two cases, which can usually be guarded against by proper care. From three to eight days is the average duration of the disease proper, but its effects upon the system are comparatively severe so that several weeks more are often needed for a full convalescence." Persons who may be seriously ill only a week will often require from three weeks to a month to attain once more their normal condition.

Remedies Proposed.

The New York Sun proposes the following remedies, presumably after competent medical advice:

On the first appearance of the characteristic symptoms a full dose of quinine should be taken. In an adult, without any constitutional peculiarity unfavorable to the action of quinine, the first dose should be 20 grains. After this, ten grains may be taken three times a day, unless there should be intense ringing in the ears, with some impairment of hearing. An attempt should also be made to destroy the microbe by local applications.

A gargle of one drachm of borax, one drachm of salicylic acid, one fluid ounce of glycerine and seven ounces of rose-water should be used three or four times in the day. At night, ten grains of Dover's powder, with hot drinks and abundant bedclothing to promote perspiration, would be useful.

Those who prefer simpler means of treatment will find the adoption of a diet of fruit, farinaceous foods and cereals of great value. Lemons should be used freely, and the nasal passages cleansed often with common salt and water. Inhalations of carbolic acid and iodine will aid in destroying the germs. In most cases the latter treatment will probably be sufficient, and a resolute exercise of the will-power will not come amiss in preventing the disease from acquiring the mastery.

Nothing to Do With the Cholera.

Dr. Robin, above quoted, says: "The theory has been advanced that influenza is the forerunner of cholera, but I regard that as pure nonsense. It is true that several times in the present century an influenza epidemic has been closely followed by a visitation of cholera. It is also true that several times in the same century there has been an epidemic of influenza with no cholera following, just as there have been epidemics of cholera with no influenza preceding. The fact is that the two diseases are so utterly dissimilar as to make any such sequence all but impossible, and any occasional instances of their simultaneous appearance must be regarded as a mere coincidence with no deeper significance." It is supposed to originate from a microbe. The microbe of consumption, cholera and even of whooping cough has been discovered, and the Paris savants are already working to discover the influenza microbe.

One Can Catch It In the Air.

By mere breathing, the microbes can be taken into the system, so that when it starts it soon has the whole population of a city sniffling and sneezing. Nearly all the civilized world, just at this time, is sneezing as they never collected before.

Imagination Has Much to Do With the Disease.

The imagination, in this as in many other epidemics, is apt to aggravate the disease.

Don't be afraid of it; but when you are attacked, just give way to it and put yourself under the care of a good physician and you will soon be all right. The sensational reports given in the daily papers do much injury in this direction. A prominent physician of Washington says: "I think that in 99 cases out of 100 there is nothing else the matter with the people who think they have the epidemic than a very natural and ordinary cold in the head. There is nothing unusual about such colds at this time of the year. In fact, I do not know that I ever saw a year go by when two-thirds of my friends did not, at this season, suffer from such a cold. But the moment the newspapers call attention to the fact that there is a new disease prevalent in some corner of the world every man who has the sniffles begins to believe that he has the symptoms of the epidemic. Of course, there is undoubtedly some truth in the existence of this peculiar disease. The reports from the other half of the world prove that; but what I contend is that in a vast majority of cases there is nothing extraordinary the matter, but that the sufferers imagine that their cases correspond exactly with the genuine cases of la grippe. It all comes from the attention which is called to the epidemic in the newspapers. I would venture to say that where there is one genuine case of influenza, there are 99 imitations."

ELECTRICITY.

The Continuous vs. Alternating Currents.

The principals in the incandescent-lighting field have both had their say in the *North American Review*. Mr. Westinghouse having answered Edison in the current number. Edison's argument appears to be dictated by self-interest, and its motive is stated in his own words: "My personal desire would be to prohibit entirely the use of alternating currents." Westinghouse contends that the alternating current system, which is that upon which the incandescent lamps in most cities are run, is the safest, because the converter, which is placed on the premises of every consumer, is an impassable barrier through which none of the high-tension street currents can pass, and which absolutely protects the consumer against injury or fire. The only danger which can result from the use of the alternating-current system is from the wires in the streets carrying the high-tension currents, and this danger Mr. Westinghouse believes can be entirely removed by placing the wires under ground. Mr. Westinghouse expresses himself as being a firm believer in the underground system. He contends that the experience of Chicago and Philadelphia in the use of underground cables for high-tension currents, to say nothing of the large number of cables laid underground in Rome, Berlin, Milan and in other cities, indicates that the success of properly constructed underground systems, whether for currents of high or low tension, has been established beyond question.

Whatever may be the result of this controversy, it is becoming more and more evident that something will have to be done regarding wires carrying electricity at high tension. Whether it is practical or not to obtain a proper insulation of the wires underground, their presence overhead, as now prepared and maintained, is clearly a source of too great danger to life to allow of their permanent continuance. But instead of such violent action as has been taken in New York for their abatement, would it not be much wiser to look around for some improved and more safe method of placement for the wires? The rapid improvements that are being made in handling the electric current, and the great demand for its use, would seem to point to some such conservative policy.

The telegraph has just, at this present writing, announced that a method of personal insulation has been devised in Erie, Penn., by which a person with a moist hand, and standing upon moist ground, can safely grasp an uninsulated wire in his naked hand, through which is passing a current of over 500 volts. If such a thing is possible, we ought certainly to look confidently for some device by which that current can be safely carried from point to point, either above or under ground. In the present earnest need for a way, surely some genius will soon give to the world a method by which electricity for light may be distributed as safely as gas.

ELECTRIC MICROMETER.—Practical electricity says that a machine has recently been invented by Mr. Bain of Chicago, Ill., which is of practical value to shoe manufacturers. The machine is an electric micrometer which can cut pieces of leather according to thickness and distribute them in separate receptacles. It separates taps which vary in thickness as little as one-thousandth of an inch. It has a capacity of 5000 taps per hour. Besides sorting the pieces of leather, the machine automatically records the number placed in each receptacle. When the machine is in operation, all that is required of the attendant is to put the taps in a trough-like box. A follower is then adjusted behind the taps which keeps them in an upright position and maintains a constant pressure as they are fed from the trough into two abutting fingers. The taps are

in return fed from the trough into micrometer fingers, which pass successively into position. The fingers, which are fed around by a ratchet movement, pause a short time over the receptacles for taps. When a micrometer finger reaches one of these bins in which the tap that it holds should be dropped, the inner extension of the finger touches an electric contact, and the tap will fall from the jaws. The operation of the finger is made to actuate a counter which indicates the number of taps in every receptacle. The apparatus is furnished with current by a small dynamo especially constructed for the purpose. The machine is simple and accurate, and is not liable to get out of order. The whole appliance is the invention of Mr. Bain of Chicago.

A POINT OF SUPERIORITY OF THE ELECTRIC CAR.—An accident in New York a few days ago when a horse car became unmanageable through the failure of a brake, brings to the front again one of the chief points of superiority of the electric car, namely, the possibility of an almost instant reversal. If the brake of an electric car fails, the current can be reversed and the car brought to a standstill or even started in an opposite direction, quicker than by any other method used on street railways, and this is unquestionably one of the strongest reasons why the electric car is best suited to run at a high rate of speed in ordinary city or suburban streets.—*Boston Journal of Commerce.*

AN ELECTRICAL TOOTH EXTRACTOR.—An electrical instrument has been invented which is designed to remove the pain incidental to the extraction of teeth. It consists of adjustable prongs carrying buttons and connected with an electrical battery. The buttons are placed on the face over the nerves leading from the teeth to the brain, and a circuit is established the moment the extracting instrument touches the tooth to be removed.

PROGRESS OF ELECTRIC WELDING.—It is reported that the Thomson Electric Welding Co. will erect a factory at East Chattanooga, Tenn., at a cost of \$1,000,000.

ENGINEERING NOTES.

A CANAL ACROSS ITALY.—Signor Vittorino Bocca, the eminent Italian engineer, proposes to join the Tyrrhenian sea with the Adriatic by a ship canal, which crossing the peninsula from Montalto di Castro, province of Rome, in a northeasterly direction, would reach the east coast of Fano. The canal is to have a length of 124 miles, to be 263 feet wide, and to have a depth of 40 feet. At each end of the canal a port is to be constructed, having an area of 129 acres, and four entrances each of 74 acres. The cost of construction is estimated at £25,000,000. This is a highly important work in more senses than one. It is to be made a national enterprise. The canal, with its great width and depth, would be navigable for the largest ironclads. It is also urged that the internal trade of Italy would gain greatly by the canal, and that the provinces of Rome, Grosseto, Siena, Arezzo, Perugia, Pessaro and Ancona would obtain through it direct water communication. The drainage and improvement of the marshy districts through which the canal would pass would be facilitated, and it is further stated that by the reclamation of the lakes of Bolsena, Chiusi and Montepulciano, and the Trasimene Lake, an area of 170 square miles would be rendered fit for cultivation. The cost of constructing the canal is estimated at \$125,000,000.

TO BE GIVEN A PRACTICAL TRIAL.—A practical trial is about to be given to the project for a railway for heavy ships. There is a narrow neck of land, 17 miles wide, called Chignecto Isthmus, which connects the two provinces of Nova Scotia and New Brunswick. It has long been considered a matter of great commercial importance that either a ship canal or a ship railway should be constructed across this isthmus. Such a work would save a voyage of 500 miles through rough and stormy waters to the large and growing commerce which is carried on between the St. Lawrence river and ports on the Atlantic coast. A ship railway was decided upon some time ago, and work on the same has been commenced and will be completed in about twelve months from this time. The rails for this track will be of steel and the heaviest ever made—110 pounds to the yard. There will be a double track, upon which a train will rest for holding the ship during its transfer. Two locomotives of mammoth construction will be employed in drawing the train with its burden across the isthmus. The vessels to be transported will be hoisted by hydraulic power from the basin into the cradle. The time of passage will occupy only two and one-half hours.

THE PROPOSED ENGLISH CHANNEL BRIDGE.—The French Government seems to be in earnest in regard to this scheme. The Government has appointed a committee to examine the plans which have been proposed by the projectors.

OVER 2000 feet of the Hudson river tunnel have already been excavated.

EIFFEL TOWER shares are quoted on the Paris bourse at 160, 100 being par.

USEFUL INFORMATION.

WHERE DO WHALES GO IN WINTER?—A mystery of the Arctic regions may be cleared up next year, if the season is open. This mystery is: Where do the whales go when ice begins to set in along the Alaskan Coast? Whalers know they go eastward, and it is supposed they congregate about the mouth of the great Mackenzie river, but this and the region to the northeast of the river's mouth are practically unknown territory. The Pacific Steam Whaling Co. of San Francisco has just purchased a strong steamer, which will be sent to the Arctic next spring with orders to push through to the mouth of the Mackenzie. The reason for this is that whalebone is rising in price, and this season's catch showed that the whales are rapidly decreasing in their usual feeding grounds.—*Ec.*

FILAMENTS FOR INCANDESCENT LAMPS.—It may not be generally known that the fine filaments over which the electric current runs in an incandescent lamp, are, in many cases, made of split bamboo. The preparation of these filaments is quite an art in itself. Each operative is given a small bundle of bamboo splints of less than 1-16 inch cross-section, and these are drawn through a series of fine holes until shaven down to the required size. The bamboo is then quite pliable and easily bent into the peculiar twisted form, as seen in the lamp. In this condition it is carbonized and is then ready for the lamp and electric current. Different companies use different methods. The Thomson-Houston use the bamboo filament; the Westinghouse, a prepared substance covered with lamplack.

PAINT FROM POTATOES.—Paint from potatoes is a new wrinkle in the arts and sciences. Kuhlows' *Trade Review* gives the manner of preparation. Boil a kilo of peeled potatoes in water; after mashing, dilute with water and pass through a fine sieve. Add two kilos of Spanish white diluted with four kilos of water, and the result will be a color of beautiful milk white. Different colors can be effected by the addition of different colors or minerals. Apply with a brush; it adheres to plaster and wood very well, will not peel, and best of all is cheap.

TO WASH PLUSH CLOAKS.—First hang your cloak on the line and get all the dust out of it with a switch. Then spread it on the back of a chair and sponge every inch of it with warm rain-water and a little ammonia. Take a dry sponge and rub the cloak until it is almost dry. Rub both ways, back and forth, until the nap is thoroughly raised. Lastly, hang the cloak in the sun until it is perfectly dry and brush it with a soft brush.

HOW TO WASH WHITE SILK HANDKERCHIEFS.Never allow silk handkerchiefs to become too dirty. Wash them in a warm lather made with pure white curd soap. This water should be blued, also the rinsing-water. Roll up tightly in a cloth, and iron the handkerchiefs between linen. The iron must not touch the silk, otherwise it will turn yellow. This method has been found the best for keeping silk handkerchiefs white.

COLONEL FRED CROCKER and his railway associates are pleased with the results of the land sales from their grants last year. For that period there were sold 198,477.63 acres for a total price of \$748,456.42. Of these figures the land grant of the Central Pacific road must be credited with sales aggregating 153,000 acres for \$548,954.81 and the land grant of the Southern Pacific road with 45,477.63 acres for \$199,501.61.

EGYPTIAN MUMMIES.—It has been estimated that more than 400,000,000 human mummies were made in Egypt from the beginning of the art of embalming until its discontinuance in the seventh century. Herodotus and Diodorus agree in the statement that there were three grades of embalming. The first cost in our money, about \$1225, the second about \$375, and the third was very cheap.

A NOVEL FREAK OF NATURE.—At Plant City, Fla., there has been found what seems to be a half orange with a smooth skin, and a half lemon with a rough skin, the latter being a little larger, growing together as one fruit.

A WOOLEN CLOTH is much better than a brush to polish the kitchen stove, as it makes but very little dust and gives a softer gloss to the iron. A person with weak lungs should never use a brush for this work.

CIGARS.—It is estimated that 4,000,000,000 cigars are consumed in this country annually. Sixty-six to every man, woman and child in the country.

MILK. If put in an earthen jar, or even the can, will keep sweet for a long time if the receptacle is well wrapped in a wet cloth.

THE WINGS of turkeys, geese and chickens are good to wash and clean window, as they leave no dust or lint, as cloth.

ALASKA cost the United States Government two cents an acre.



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W. B. EWER.

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Passing Events.

The stormy weather has continued, and in the mountains has blocked up roads and done more or less damage. A great deal more water has to be handled in the mines than usual, and work at some of the mills has stopped owing to the cold weather.

The influenza, or *grippe*, which has been prevailing abroad and in the East in epidemic form, has made its appearance here, but it appears to be of a much milder nature than has been the case elsewhere.

People in the mountains report a heavier snowfall than for many years. There will be an abundance of water in the spring—probably too much—and the owners of gravel mines regret that they will be unable to utilize it.

The electric plant of the Nevada mill, on the Comstock, has received its final test and has been accepted. This successful application of the use of electric-power to quartz-milling purposes will doubtless lead other mining companies to investigate the system.

Last year Alex Parker sold a gravel claim on the South fork of Scott river to a Chinese company, who paid \$50,000. The Yreka Union says they are taking out large sums every month, and the miners think they have one of the best properties in Northern California.

The Harvard Observatory.

The gift of \$50,000 received last summer by the Astronomical Observatory of Harvard College from Miss C. W. Bruce of New York for the construction of a photographic telescope of novel form, has enabled the observatory to make a contract with Messrs. Alvan Clark & Sons for a telescope having an aperture of 24 inches and a focal length of 11 feet. The Bruce telescopes will be especially adapted to studying the very faint stars, and will give a large plate reducing the work of making star maps. Its principal uses will be probably for the study of the distribution of the stars for complete catalogues of clusters, nebulae and double stars and for the spectra of faint stars.

The report of Prof. E. C. Pickering of the Harvard Observatory states that an expedition to Southern California gives them a mountain station under climatic conditions much superior to those of the eastern portions of the United States, and promises to be a satisfactory solution of the problem contemplated by Mr. Boyden in his will.

Under the Henry Draper Memorial Fund, the first research on the spectrum of over 10,000 of the brighter stars is now nearly completed and is partially in print. The photographs required for the second research on the spectrum of the fainter stars are also nearly complete.

The 13-inch telescope mounted on Mt. Wilson, Southern California, has done good work, and 1155 photographs have been obtained. As the same objects have been repeatedly photographed at Cambridge with the same instrument, an accurate comparison of the atmospheric conditions of the two places may be made. The evidence already secured shows that in summer results can be obtained at Wilson's peak which cannot be obtained at Cambridge. The difference is very pronounced for such objects as the markings on Jupiter. Clusters like that on Heron's are well resolved, so that the individual stars are easily measured, which cannot be done with the heat Cambridge photograph. As a test object, the sixth star in the trapezium of Orion nebula is clearly photographed for the first time. A new variable star has been discovered in the midst of the cluster G. C. 3636. A beginning has been made of the measurements of the position and brightness of the double stars, and it is hoped to extend this work to the clusters and thus furnish an extensive addition to this department of micrometric astronomy.

South African Gold.

Notwithstanding all the predictions of wonderful richness, the Transvaal gold-fields did not make such a remarkable showing last year. The whole of South Africa only produced \$8,000,000; and instead of there being 2000 stamps dropping with a monthly product of 75,000 ounces, there are only 35 mills with 900 stamps, and far less than that many ounces per month.

The big English syndicates that were to reap such fortunes must be much disappointed. There has been more stock-gambling than mining, and the 160 companies operating have made very little money. There is a scarcity of water and a scarcity of competent miners.

A good many rose-colored statements about these mines have been circulated in this country, with directions how to get to the country, etc. But Africa is so distant, few good gold-miners have been attracted from here. Several California superintendents have gone out there and have done well; but it is no place for an ordinary miner to go if he is making a living at home.

REDUCTION OF BODIE SALARIES.—At a special meeting of the directors of the Bodie Consolidated Mining Co., held on January 15th, the salaries of the officials of the company were reduced over 50 per cent. This action, it is claimed, was due to the present discouraging outlook in the mine and also a difficulty of collecting future assessments. At the meeting Captain John Kelley sent in his resignation as superintendent, and another Kelly was appointed to the position. The latter person is very highly spoken of by those who know him.

THE coal shipments from the various collieries in Vancouver island during the past year amounted to 427,883 tons.

The Electric-Motor Plant.

The Brush electric-motor plant to operate the Nevada mill on the Comstock, fully illustrated and described in the PRESS a few months since, has been tested and finally accepted. The plant is the largest of the kind in the world. At first there were some obstacles to overcome, and nobody seemed to know how to remedy them. H. S. Conner, a skillful electrician, came out from Cleveland to ascertain if there were any defects in the electric plant that caused its failure to fill the contract with the mill company. Mr. Conner proceeded to thoroughly overhaul the entire plant, from the dynamo chamber to the surface motors, and after a test was satisfied that the reason the plant did not fulfill the specifications of the contract with the Nevada Mill Company was due solely to the incompetency of the electricians who had charge of it during the first test. The mill has now been in constant operation, propelled by this electric plant, for three months as a final test. The test proved that 63½ per cent of the power generated in the dynamo chamber is landed on the surface motors—which is three and a half per cent more than the contract between the Brush Electric Company and Nevada Mill & Mining Company specifies. The *Virginia Chronicle* says:

The plant is the largest in the world and the cost is \$100,000. It consists of six dynamos of 100 horse power each, placed on the Sutro tunnel level of the Chollar incline, 1630 feet below the surface. These dynamos are operated by Pelton water-wheels placed on the same level. The wheels being driven by a volume of 187 inches of water confined in an iron pipe ten inches in diameter, leading from the surface-tank to the point of discharge, 1630 feet below.

The electric power generated by the dynamos is transmitted on copper wires to the surface motor-room, 2300 feet distant from the dynamo chamber.

A total of 450-horse power is required to operate the mill, which is equipped with 60 stamps, 16 pans, 10 settlers, 2 agitators and 3 sulphuret pans. Of the 450-horse power required to operate the entire mill, the Brush electric plant furnishes 350-horse power; the surface Pelton wheel on which the volume of water required to operate the Sutro tunnel dynamo is discharged prior to passing down the incline, furnishes the auxiliary power of 70 per cent.

The Bowers Dredge.

We are informed that the Bowers dredge at Tacoma is now excavating—and discharging through 3600 feet of pipe—2000 to 3000 yards of sand each 24 hours, and has nearly filled up a large tract of land for railroad purposes. It has another contract for filling in 1,000,000 cubic yards on which it will commence work in about a month, as soon as the present contract is completed. This is the same machine which was at work for some time in San Diego bay, and was towed up to Tacoma. It is capable of handling a much larger quantity of material through a shorter discharge pipe, but in this instance there are many shells which lodge in the bottom of the pipe and cause considerable friction. Otherwise the output would be two or three times as much. The harbor is being deepened at the same time that new land is being made for business purposes.

It is reported on pretty good authority that the patent right for the Puget Sound region has been sold for a large sum of money.

Mr. A. B. Bowers' suits for infringement against the Von Schmidt, Lynch, Obequette, Atlas and Hercules dredges are now pending in the United States Circuit Court in this city.

William T. Garratt.

The well-known pioneer foundryman, Wm. T. Garratt, died suddenly of heart disease on Tuesday. Mr. Garratt was 60 years of age, and may be said to have been in vigorous health up to the time of his last illness. He was born in Waterbury, Conn., and came of English stock. He came to San Francisco in 1850, and after mining in Nevada Co. for a while came back here and entered the foundry of G. W. Schnitz. The firm at that time was carrying on the dual business of coining \$5 and \$10 pieces and manufacturing brass and iron implements. Shortly afterward there was a dissolution of partnership, Schnitz retaining the coining department and Garratt taking the foundry. From that time until the day of his demise Mr. Garratt was connected with this business, and notwithstanding many reverses, lived to see his labors crowned with success in the establish-

ment of the most complete brass foundry on the coast.

His establishment was burned down several times, but finally he took the premises corner of N. Stoma and Fremont, where he has been many years. The large branch on Fifth and Brannan has only been operated a few years. Mr. Garratt has been president of the Manufacturers' Association and a member of the Chamber of Commerce and various organizations. He was one of the trustees of the State Mining Bureau at the time of his death. Besides his interest in the foundries, he was largely engaged in steamboat, railroad and mining enterprises at various times, and stood high in the business community.

Comstock Superintendents' Salaries.

There were days on the Comstock when every mine, big or little, had its superintendent at a handsome salary, some of them with very little indeed to do. But those days are gone; now, one man superintends several mines, even in the case of very important ones. The superintendents, moreover, have not now mere ornamental positions, and there are no \$1000 a month salaries, with double teams to drive and no duties except to entertain people.

Among others, the following monthly salaries are paid to mine superintendents on the Comstock, Virginia City, Nev.: To R. P. Kesting by Hale and Norcross, \$400; Savage, \$400; and Scorpion, \$150; total, \$950. A. C. Hamilton by Chollar, \$250; Potosi, \$250; Exchequer, \$150; Alpha, \$150; total, \$800. Mr. Kerwin by Best and Belcher, \$250; Gould and Curry, \$250; total, \$500. A. Lookey by Overman, \$200. D. B. Lyman by Con. California and Virginia, Ophir and Mexican, each \$187.50; Occidental, \$150; Sierra Nevada, \$250; Union, \$125; total, \$987.50. S. L. Jones by Crown Point, \$500; Belcher, charged in Crown Point, Seg. Belcher, \$150; total, \$650. W. E. Sharon, Challenge, \$250; Confidence, \$250; Yellow Jacket reported \$250; total, \$750.

The largest aggregate salary of any official connected with Comstock mines is that of O. E. Elliott, mining secretary, and next to the largest is that of A. K. P. Harmon, mining president. The latter's income from that source is \$850 a month.

But they do not pay the superintendents such salaries on the Comstock as are paid in some other places. A number of them have gone abroad for foreign companies and receive very handsome annual sums. For instance, Mr. Patton, formerly of the Comstock, gets in Australia \$30,000 a year for superintending the Broken Hill mine.

In the Mountains.

In the mountain and mining counties, there has been a very heavy snowfall this winter. In fact there has been more snow than in the memorable winter of 1860, and more cold weather than in 1853-4. Some lives have been lost by snowslides and travel is everywhere impeded. Some mills and mines have had to close down because of lack of supplies or the freezing up of ditches. The railroads have had difficulty to keep in operation, and teaming has been impossible. In the gulches and bottoms the snow has been soft, so as to render snow-shoeing very hard. The ground is thoroughly soaked so that the pumps at all the mines have been kept busy. In some places, as at the summit, 16 to 17 feet of snow has fallen on a level.

What will happen in the spring if this snow melts rapidly is unpleasant to contemplate. The hydraulic mine-owners regret that they will be unable to work, though there will be an abundance of water; but for other mining operations a prosperous year is predicted. The snow has come much lower down the foothills this year than is ordinarily the case.

TWO COMPETENT MEN.—The mining combination that has entered into a compact to commence pumping water out of the Gold Hill mines has engaged W. R. Eckart, a prominent mining and civil engineer, and Mr. James E. Dow, manufacturer of pumping and general hydraulic machinery, of San Francisco, to draw up plans for the purpose and to produce a pump for sinking purposes. After the water is lowered, it is intended to double the pumping capacity by placing a stationary pump at the lowest point obtainable.

Shocking Waste of Timber.

We have often had severe denunciations of timber waste and earnest appeals to people to refrain from it, but no verbal exhortation could be so eloquent as the picture which we give upon this page. It was made by the Dwyer Engraving Co. for the State Board of Forestry directly from a photograph submitted by W. S. Lyon, State Forester. Consequently it presents an actual scene and one which fortunately one does not need to go far to see its like in the timbered regions of the State. The picture accompanies a memorial which the State Board of Forestry has just transmitted to Congress and is well calculated to open the eyes of the law-makers to the onpable waste of valuable property which should be summarily checked by adequate legislation. The cutting which the

stances these outrages are perpetrated upon the public domain, and are as indefensible as would be the acts of a farmer in burning the fields and breaking down the fences of another for the purpose of securing a more expeditious route to market."

The memorial of the State Board is a strong document on many accounts. It alludes first to the need of maintaining a forest covering on our mountain to conserve the water for irrigation of our arid lands. This is a subject which is each year commanding wider support, and we are glad to know that organized effort in some of our irrigated districts is being put forth to secure the desired ends. The memorial presents that the most feasible way to secure the retention of a forest covering is to withhold the timber land from sale or entry and to sell the timber crop, guarding the area so that

Natural Gas.

The continuous discoveries of natural gas in so many different portions of the world give rise to the question whether its generation is of modern occurrence or more antique origin. Its existence has been known in isolated locations for over a century in the United States. In those localities it was exceedingly limited in quantity, and while it was considered a curiosity, it never rose to any importance. But within a comparatively few years past, it has assumed such gigantic proportions as an illuminator for cities and towns, and as a fuel in furnaces, factories and dwellings, that it becomes a marvel, if it is not of recent origin, why its utility was suffered to remain so long unrecognized. It was known in the Province of Tsien Lan Tsing, China, and wells were

per diem, according to a report by Prof. James Dewar, F. R. S. This flow has been going on from old wells for 10, 12 and even 20 years in the vicinity of Pittsburgh. The immense expansion that follows this wonderful flow reduces the temperature so greatly that near the top there is an ice coating on or near the whole of the pipe. This refrigerating property has manifested itself in several gas wells. In some cases the ice has formed so solid about the drills that it checked operations for the time being. At Jo Jo, in Western Pennsylvania, gas was struck at 1000 feet. In attempting to bail the well, the bailer stuck fast for awhile. When it was at last brought to the surface, the bottom was covered with ice.

Natural gas is now found in every civilized country. The aggregate flow of all the wells of the world would make such a startling array



IMPROVIDENT METHODS OF CUTTING TIMBER, AS INSTANCED IN THE MEMORIAL OF THE STATE BOARD OF FORESTRY.

opening the way to private property or to give access to still richer stores of public property. Thus the acts are strictly within the scope of the General Government. The memorial to which we allude makes this forcible allusion to the destruction of timber to which we refer: "A forest, or timber, like any other crop, when mature, is fit to harvest, and when not subject to wasteful abuses may with propriety and benefit be cut; when, however, to facilitate access to a tract, vast quantities of intervening lands are laid waste and valuable timber is left engraving shows was not for the purpose of supplying merchantable lumber or fuel, but merely for opening the way to more densely wooded tracts. If men did this on their own lands the orifice could not do much more than deplore the wanton waste, but such cutting generally occurs on the public domain for the purpose of to decay and destruction (as is well illustrated in the accompanying photographic reproduction of a common incident of our lumber country), these methods become improvident and should be rigorously suppressed. In most lu-

a second growth shall not be interfered with by fire or sheep-herding. This would make the timber area of our mountains, which is still owned by the Government, a perpetual reserve which shall, through all coming generations, furnish ample supplies of timber and fuel, and at the same time rescue the valleys in the future, to some extent at least, from ruinous floods, and to store water to be sent down gradually upon the plains as irrigators can use it. These things should command public attention and support, and we have no doubt the efforts of our State Board will have much influence in that direction.

THE MINT COMMISSION.—Among the commissions appointed by the President to test and examine the weight and fineness of coins at the several U. S. Mints are Senator J. P. Jones, H. L. Dodge and Prof. Thos. Price of this city.

RAIN fell in Oregon and Washington 19 days, in Southern California on 18 days, and in Northern California on 24 days in December.

drilled there 3000 feet deep. The gas was conveyed through bamboo pipes and burned in clay burners. In Virginia, in 1775, Washington set apart a square mile of territory in Kanawha valley, in which was a burning spring which he deeded to the public forever, but his purpose was defeated. When General Lafayette passed through the then village of Fredonia, N. Y., about 40 miles south of Buffalo, the inn at which he stopped was illuminated by natural gas through 30 burners. In 1859 its presence was well known in the coal regions of Pennsylvania. In 1865 a well was drilled near Wilcox, 100 miles east of Erie, from which gas flowed under a pressure of 600 pounds to the square inch. Until 1881, natural gas was only used for local illumination, for local fuel and the manufacture of high-grade lampblack. Its flow was permitted to escape without utilization. The exact loss cannot be ascertained, but it approximates closely to an equivalent of 100,000,000 tons of coal. The amount of gas which flows from some individual wells reaches the enormous quantity of 30,000,000 cubic feet

of figures as would terrify those who saw it into a belief that some terrible catastrophe would result from such an extraction from the earth's center. Three hundred and fifty million cubic feet came daily to Pittsburgh in September, 1886. In some adjacent localities the daily flow is 30,000,000 cubic feet. The Karg well at Findlay, O., discharged 40,000,000 cubic feet per day, and other wells there wasted in the air 10,000,000 daily. At Belle Vernon the outflow is 12,000,000 feet per 24 hours. The aggregate of eleven districts amounts to 8,644,000,000 cubic feet of natural gas every 24 hours. The pressure per square inch varies from 200 to over 600 pounds. The flames from the burning gas reach the height of from 50 to over 100 feet. If a correct statement of the products of the gas-fields of the United States could be obtained it would probably reach the enormous amount of over 20,000,000,000 cubic feet each day of 24 hours. This would be equal to a space of 28,967.66 square miles. The elasticity of the gas and the additional supply which would rise to fill the otherwise vacuum, pre-

vents the occurrence of a catastrophe which would be direful in its consequences. The question then arises: How long can this withdrawal from the earth's center continue harmless? At present, its escape from below, the surface of the earth may be preventive of an awful explosion. It may be the safety valve to let off some of the enormous pressure, which as mentioned above reached at times over 600 pounds to the square inch. This subterranean pressure must be continually increasing, despite the activity of all the volcanoes of the world; and the drillings, though but an infinitesimal factor compared with the surface of the earth, may retard temporarily, in connection with them, the final destruction by fire which is foretold as the doom of the globe. When we remember that some far distant stars have suddenly burst into flame and been lost to sight ever after, it may be a natural ratiocination that they were resolved into their primal gaseous condition which La Place asserts to have been their origin.

The commercial value of natural-gas wells may be better understood when it is known that pipe lines are extended 20 or 30 miles, and that one of the companies is estimating the cost of piping the gas 90 miles to Cincinnati, and delivering there 20,000,000 cubic feet per 24 hours! The obstacle they will have to contend with will be the condensation in extreme cold weather, which will diminish the pressure at the terminus of the line. The Philadelphia Company is piping into Pittsburgh 300,000,000 to 500,000,000 cubic feet of natural gas per day. This is equivalent to from 20,000 to 25,000 tons of coal.

Regarding extensive explosions of natural gas deep down in the wells, no apprehension need be experienced on that score. To render the natural gas explosive, it requires to be intermixed with from 9 to 14 parts of air to one of gas. While the pressure of gas at the surface is over that of the atmosphere, which is about 15 pounds to the square inch, it follows as a matter of course that the air cannot descend into the well. Before the pressure would be reduced sufficiently to admit from 9 to 15 parts of air to one of gas, the water would rise above the gas, even if it did not flow from the well. Consequently under this condition the mixture of air and gas could not occur. Another preventive would be that when the pressure became so greatly reduced, the sand would choke the well; this would keep the air from reaching the gas. There is therefore no cause to apprehend any vast explosion, or even a limited one.

The durability of the yield of gas may be considered positive. The gas is the resultant of the commingling of hydrocarbon oils and water. A slight quantity of air would accelerate the evolution of hydrogen from the water blended with the oil.

The most recent geological formations are all permeated by hydrocarbon compounds of some kind. It follows that the gas is generated by chemical action or by resolving into its original elements some compound mineral substance; consequently the formation of the gas is progressing continuously at the present time, as it has ever been. These carboniferous strata are replete with oils and hydrocarbons, which are continually being transposed into new forms by either or both an increase of oxygen or hydrogen. The liquid form, if exposed to the air, becomes a vaporous hydrocarbon. As this chemical action is in constant operation, the supply of the gas may safely be considered as certain for all time to come. The final conflagration must arise from some other source than that of the gas wells, for their sphere is too limited to affect the entire globe, for the aggregation of them all would be equal only to a small grain of dust upon a six-foot globe.

The natural-gas industry may therefore be considered as an enduring one that will increase instead of diminishing its supply.

DELINQUENT SALE NOTICE.

Booth Gold Mining Company. Location of principal place of business, San Francisco, California. Location of Works, Auburn, Placer Co., Cal. NOTICE.—There is delinquent upon the following described Stock, on account of Assessment (No. 4), levied on the 23d day of November, 1889, the several amounts set opposite the names of the respective Shareholders, as follows:

NAMES.	No. Certificates.	No. Shares.	Am't.
Richard Chenery, Trustee.	160	6,275	\$125 50
Richard Chenery.	17	5	10
Charles F. Eaton.	171	300	6 00
Charles F. Eaton.	172	300	6 00
Charles F. Eaton.	173	60	1 20
R. N. Craves, Trustee.	25	250	5 00
E. S. Harrison.	177	1,000	20 00
Ces. R. Spinney, Trustee.	32	312	6 24
Geo. R. Spinney, Trustee.	176	500	10 00
E. P. Slosson, Trustee.	181	500	10 00

And in accordance with law, and an order of the Board of Directors, made on the 23d day of November, 1889, so many shares of each parcel of such Stock as may be necessary, will be sold at public Auction, at the sales-room of Middleton & Sharro, No. 22 Montgomery street, San Francisco, California, on MONDAY, THE TWENTY-ETH (20th) DAY OF JANUARY, 1890, at the hour of 3 o'clock p. m., of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of the sale.

GEO. R. SPINNEY, Secretary.

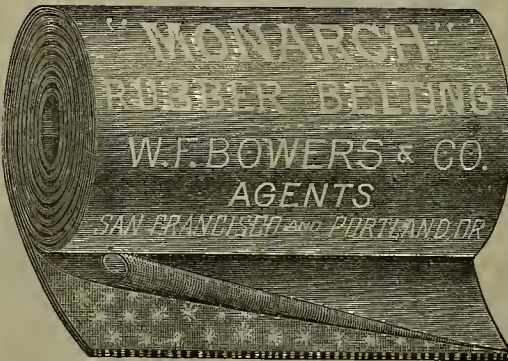
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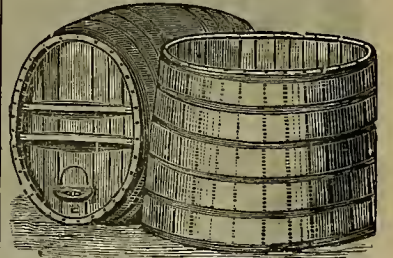
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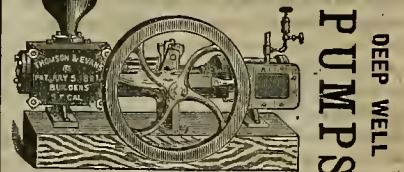
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List of U.S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

FOR WEEK ENDING DEC. 31, 1889.

- 418,346.—STATION INDICATOR—M. Anthony, S. F.
 418,347.—STATION INDICATOR—M. Anthony, S. F.
 418,639.—SHIRT—Frank Bauer, Slide, Cal.
 418,496.—SUCTION DREDGE—J. W. Brown, S. F.
 418,505.—HASP LOCK—Descalzo & Mortimer, Peters, Cal.
 411,052.—COLLAR STUFFING MACHINE—C. Ewing, S. F.
 418,407.—FRUIT DRIER—F. H. Gilbert, Union Ridge, Washington.
 418,612.—OCEAN MOTOR—L. S. Goldman, Los Angeles, Cal.
 418,513.—HYDRANT COUPLING—S. R. Hackley, S. F.
 418,514.—CONCENTRATOR—I. W. Heilig, Pottstown, Pa.
 418,531.—WINDMILL—A. G. Norton, Arroyo Grande, Cal.
 418,471.—SETTING SPUD FOR DREDGERS—A. P. Payson, S. F.
 418,221.—DERRICK—W. B. Pless, Stockton, Cal.
 418,590.—SURF POWER—J. Ringer, Coronado, Cal.
 418,481.—HYDRO-CARBON BURNER—J. H. Whitburo, Los Angeles, Cal.

FOR WEEK ENDING JAN. 7, 1890.

- 418,860.—METALLIC ROOFING—H. Anderson, S. F.
 418,862.—SHOE FOR THRASHERS—Henry Bryao, Modesto, Cal.
 418,941.—BROOM-BRUSH BRIDLE—J. B. Buteoschon, Portland, Or.
 418,943.—WAVE MOTOR—R. B. Davy, San Diego, Cal.
 418,865.—OAT HULLER—L. C. Dibert, S. F.
 418,867.—DISCHARGE DOOR FOR STEAM DIGESTERS—P. F. Dundon, S. F.
 418,868.—ANNUNCIATOR—J. Finck, S. F.
 418,712.—TRACK GAGE—J. J. Griffin, San Bernardino, Cal.
 418,946.—FOLDING BED SCREEN—J. J. Griffin, San Bernardino, Cal.
 419,014.—STAMP CANCELING MACHINE—W. Groth, Seattle, Wash.
 418,870.—RULER AND PENCIL SHARPENER—J. T. Hazlett, S. F.
 418,871.—ELECTRICAL INDICATING APPARATUS—G. A. Holt, Oakland, Cal.
 418,730.—HOP-DRIER—W. J. Leechman, Slaughter, Wash.
 418,873.—WELL-BORING APPARATUS—E. F. Littlepage, San Jose, Cal.
 418,732.—CAR-COUPLING—A. Lyoch, Eugene City, Or.
 418,874.—SAW SETTING MACHINE—B. McIntire, S. F.
 419,066.—LIFE PRESERVER—O. Quist, Colton, Cal.
 418,877.—WINDMILL GOVERNOR—A. J. Salisbury, Hueneme, Cal.
 419,082.—HORSE-CHECKING DEVICE—W. P. Smith, Renton, Wash.
 418,964.—KNIFE CLEANER—Jos. Thompson, Decoto, Cal.
 418,965.—BIRD TRAP—B. Walton, Compton, Cal.
 418,966.—VENTILATOR FOR BOOTS AND SHOES—P. Weland, S. F.

The following brief list by telegraph, for Jan. 14, will appear more complete on receipt of mail advices:

California—James Spiers and E. H. Booth, S. F., rock-breaker; Jacob Price, San Leandro, traction engine; James M. Schofield, Merced, bottle-topper; Bartlett McIntire, assignor to the Vulcan Iron Works, S. F., clip for wire rope way; George W. Pardee and G. and R. H. Leaman, Tower Lake, wagon-brake; Edward M. Knight, San Mateo, assignor to Rapid Safety Filter Co., S. F., filter; Frank A. Huntington, S. F., cushioning-mill; William H. Keep, assignor of half to S. A. Hathaway, Stockton, windmill; Miss B. Dodge, assignor to Parks & Lacy, S. F., two patents for rock-breaker; George E. Dow, S. F., pump; John W. Eisenhuth, S. F., clipping machine; Isaac B. Abraham, S. F., adjustable and removable armor for ships; Frank W. Bitley, S. F., flexible shaft coupling.

Notes.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast Inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

COMBINED RULER AND PENCIL-SHARPENER. John T. Hazlett, S. F. No. 418,870. Dated Jan. 7, 1890. This is one of that class of articles in which a ruler and pencil-sharpener are combined in a single instrument or device. In this the ruler has a longitudinal groove in its top with side flanges, and a pencil-sharpener seated in said groove with its surface below the surface of the ruler, whereby the side flanges serve as guides for the movement of the pencil and the sliding strips in said groove at each end of the ruler, and abutting against the ends of the sharpener for holding the sharpener in place.

DISCHARGE DOOR FOR STEAM DIGESTERS AND RETORTS.—P. F. Dundon, S. F. No. 418,867. Dated Jan. 7, 1890. The invention relates to a drop bottom or door for discharging the contents of digesters or steam tanks which are used for rendering lard, tallow, and other like matters. It consists of a door or bottom suitably fixed to the bottom of the digester, a lever-arm and a supplemental eccentric lever for locking the same, and the door when closed, and a screw which acts against the door to produce any desired compression upon it after the

lever is locked in place, together with certain details of construction.

ANNUNCIATOR.—Julius Finck, S. F. No. 418,868. Dated Jan. 7, 1890. The invention relates to the drops for electric annunciators. It consists in the novel arrangement of the drop-shutter and the armature of the magnet. The object of the invention is to provide an annunciator drop which is adapted to be operated by a simple construction and arrangement of the armature, thereby simplifying and lessening the cost of the manufacture of the device.

OAT HULLER.—Lloyd C. Dibert, S. F. No. 418,865. Dated Jan. 7, 1890. This invention belongs in the class of grinding-mill-stock machinery and the object is to provide a machine of this class of great capacity and adapted for rapid and effective work.

SHOE FOR THRASHING MACHINES.—Henry Bryan, Modesto, No. 418,862. Dated Jan. 7, 1890. This patent covers certain improvements in thrashing-machines, and it is especially applicable to the shoe in which the sieves or screens are fixed. The peculiar movement given to the shoe is particularly useful in clearing the sieve of green heavy weeds which are often cut and carried through the threshing and cleaning machinery and which are liable to clog the cleaning sieves. By the peculiar motion designed the weeds are lifted continuously and the grain allowed to settle through and separate from them.

WINDMILL GOVERNOR.—Alfred J. Salisbury, Hueneme, Ventura Co. No. 418,877. Dated Jan. 7, 1890. By means of a variable fulcrum and a series of weights any wind may be utilized by the windmill, giving each velocity of wind only such work as it can do.

ELECTRICAL INDICATING APPARATUS.—Geo. A. Holt, Oakland (Mary E. Holt, administratrix of said G. A. Holt, deceased). No. 418,871. Dated Jan. 7, 1890. The object of this invention is to provide for the electrical transmission of the readings or record of one indicator located in a given position to one or more indicators located or distributed at convenient points, whereby the condition of the first-named indicator may be readily seen without examining it directly. The invention consists in the novel circuit-maker and breaker in connection with the indicator whose readings are to be transmitted, the novel mechanism of the indicator to which the readings are transmitted, an electric circuit, and details of construction. This device may be used in connection with the indicator of a ship's log, or, in fact, any kind of indicator.

SAW-SETTING MACHINE.—Bartlett McIntire, S. F., assignor to the Vulcan Iron Works. No. 418,874. Dated Jan. 7, 1890. This is a simple and effective saw-setting machine especially adapted for the setting of the teeth of band-saws.

WELL-BORING APPARATUS.—Europe F. Littlepage, San Jose. No. 418,873. Dated Jan. 7, 1890. A casing is lowered into the outer casing of the well, within which it moves easily; a chain provided with elevator buckets is lengthened the desired extent, and a sufficient number of the lengths of a channel-iron guide are attached together to lower the cutters to the bottom of the well. The chain being revolved by means of the driving shaft and gearing at the top, it causes the revolution of the chain-wheel and shaft within the casing at the bottom of the well. The cutters are caused to continuously excavate the material beneath the well-casing so as to allow the latter to be pushed down as the work proceeds. At the same time the elevator buckets on the chain serve to carry up all the material excavated and delivered at the top of the well, this operation continuing as long as may be desired.

METALLIC COVERING FOR ROOFS AND WALLS. Henry Anderson, S. F. No. 418,860. Dated Jan. 7, 1890. This is an improvement in covering the roofs and walls of buildings and consists of narrow strips, which are nailed upon the studding or rafters of the building, and in conjunction with these of a series of overlapping, fire-proof metallic plates or shingles, which are placed upon these strips and are in turn held in place by them.

QUICKSILVER STATISTICS.—The Superintendent of Census has appointed J. B. Randol of this city as special agent of the Census Office for the collection of statistics relating to quicksilver. No better appointment could have been made, Mr. Randol being thoroughly conversant with the subject and accustomed to doing such work—in fact he has personally collected the data concerning quicksilver mining for many years past, and his annual tables of production are considered authoritative. Mine operators and owners of works are assured that their answers to the questions sent them will be held strictly confidential and the names or operations of individuals will not be disclosed.

ROBERT M. HOWLAND of this city, well known in the mining regions of the coast, died at Lordsburg, N. M., on Tuesday last. He was 51 years of age and came to the Pacific Slope from the State of New York 33 years ago, and was one of the first miners in the White Pine district and in several other camps of Nevada.

THE lumber-mills on Puget Sound have reduced their working-time.

The Magnetism of Some Metals and Minerals.

[Written for the PRESS by MELVILLE ATTWOOD.]

The nine metals classified as "Noble Metals" are non-magnetic and do not therefore exert any influence on the magnetic needle. They are as follows:

	Specific gravity.
1—Mercury	13.5
2—Silver	10.47
3—Gold	19.4
4—Platinum	21.5
5—Palladium	11.8
6—Rhodium	11
7—Iridium	22.4
8—Ruthenium	12.7
9—Osmium	22.5

Of the base metals, five are known to be magnetic, namely:

	Specific gravity.
1—Iron	7.8
2—Nickel	8.8
3—Cobalt	8.5
4—Chromium	6.8
5—Manganese	7.2

To this number may also be added the "Native Alloy" found in the black sand with the sea-beach gold at Gold Bluff and other places on the California and Oregon coast. The native alloy occurs in thin scales of about 1-50 of an inch in diameter, and in color very much resembles nickel. It is strongly magnetic and can easily be separated from the black sand and platinum with a common bar magnet. The specific gravity is 18. An analysis was made with the following results: Platinum, 48; osmium, 44; iron, 6; remainder undetermined.

The following are a few of the "minerals" known to exert a sensible influence upon the magnetic needle: 1st, magnetite (magnetic iron ore); 2d, pyrrhotite (magnetic pyrites); 3d, franklinite (zinc ore); 4th, almandite (gem); and 5th, kyanite.

1st—Magnetite, magnetic oxide of iron. When pure it contains 72.41 per cent of iron. It occurs crystallized, massive, and in a state of sand. Chrome iron ore is sometimes met with in a similar state and may readily be mistaken for magnetic ore, but it may be instantly distinguished from the latter by being non-magnetic. Magnetite is the most important of the ores of iron, and it is from that ore, with charcoal as a fuel, that the finest kinds of iron and steel are produced.

The Russians have acquired a high reputation for a particular description of sheet iron; their mode of manufacture is kept secret, but they are made from iron smelted and worked throughout with charcoal as the fuel.

The Norwegian charcoal blooms (bloom—a lump of malleable iron hammered out into a solid, more or less rectangular mass) bring in Sheffield, England, from \$90 to \$100 per ton. The ore used for making the blooms is a magnetite, and the fuel charcoal. The charcoal is made from spruce and Scotch fir. It takes upward of a ton of charcoal for every ton pig iron produced.

The iron used at the gold mines in Brazil is mostly made by the Catalan process from magnetite with charcoal, and is much cheaper and in every respect superior to the iron used in our Californian quartz-mills.

In considering the theory of the "Catalan Forge or Blooming Furnace" (although direct experiment is required to settle the point), it is probable that during the first two hours when a weak stream of blast is found most advantageous to the process, carbonic oxide is a principal result of the smothered combustion, and this gas reacting for such length of time on a pulverized ore effects its complete deoxidation.

The subsequent increase of temperature causes the grains of reduced iron to agglutinate together, as in the puddling process, into a bloom capable of being molded under the hammer.

Specimens of Norwegian magnetite may be seen at this office. They were selected by the late David Forbes, when consulting engineer to the Norwegian Charcoal Iron Co.

In this State we have many large deposits of magnetite as pure as any found in Norway, and near them abundance of spruce, nut pine and other timber from which the best of charcoal can be made. Water-power can also be had for the blast and for forging, so that the finest kind of iron can be made in this State at a comparatively cheap rate, and with the advantage of a home market for all that can be made.

A large quantity of Norwegian iron is now being used in our different quartz-mills. This is one of the industries that has been sadly neglected.

Nickeliferous pyrrhotite is the ore from which most of the nickel of commerce is obtained. It is strongly magnetic, specific gravity from 4.50 to 4.90. It is found in quantity at the Gap mine (New Jersey), at Modum, Norway, Craigmuir mine, Scotland, at Piedmont, etc. I lately received some specimens from a large and newly discovered deposit in Canada.

The ore was so strongly magnetic that I got Mr. Laine, the lapidary, to cut out from one of the specimens a piece of the ore into the shape of a bar magnet with which I can now readily pick up iron filings.

Prof. Price has lately discovered in one of the gold mines he is working near Placerville a considerable quantity of nickel mixed with the pyritic matter.

"Kyanite," a dense silicate of alumina, when suspended on an axis, will behave like a

compass needle and may be used as such, a fact little known but worth knowing.

In the MINING AND SCIENTIFIC PRESS, Jan. 21, 1888, there is a drawing and description of an "Electro-Magnetic Apparatus for Separating Ores." It has been used extensively in freeing the magnetites from earthy matter and other impurities.

The smaller machine with permanent magnets might be used to great advantage in the milling of gold quartz and silver ore; the pulp from the batteries being made to pass over the rollers on its way to the amalgamating pans so that any magnetite or shrouded iron from the shoes and dies that might be in the pulp would be taken out of it. The abraded iron from the shoes and dies in a large mill will amount to from 100 to 300 pounds per day, according to the hardness of the veinstone.

It frequently happens that in copper mines a large quantity of zincblende is mixed with the yellow ore, rendering both nearly valueless, as they cannot be separated by dressing, but if both are crushed fine and dressed together and afterward carefully calcined, and the calcined ore passed over the magnetic rollers, the copper will be separated and the zinc may be distilled without injuring the retorts—so that both ores may by that simple means be made valuable.

In 1867 David Forbes gave me a small "dipping needle" of the same pattern as then used by the Norwegian mining engineers for tracing their magnetic iron deposits, which are sometimes covered to a considerable depth with earthy matter.

A large-sized instrument after the same pattern, with a movable graduated circle attached to it, could be used in the examination of large cast and wrought iron shaftings. By simply passing it along the face of the shaft it would show if there was any defect in the casting of the former or welding of the latter.

Meetings and Elections.

SAN FRANCISCO STOCK AND EXCHANGE BOARD, Jan. 14.—President, W. E. Norwood; vice-president, Walter Turnbull; treasurer, Geo. T. Marye; chairman, O. V. Walker, and secretary, Fred W. Hadley; Committee on Membership—George C. Hickox, T. T. Atkinson, W. Edwards, J. B. Dyer, C. D. Laing, Charles E. Anderson and Charles H. Stoutenborough.

PACIFIC STOCK BOARD, Jan. 14.—Robert G. Horn, president; Stephen Otis, vice-president; R. C. Tobin, treasurer; Frank Moroney, secretary; J. B. Bourne, caller, and W. H. Wright, W. S. Taylor and T. McGinnis, Executive Committee.

SILVER KING M. CO., Jan. 14.—Directors—C. H. Fish, H. H. Noble, W. S. Lyle, Geo. E. Grey and E. A. Barney. Lawyer Crittenden submitted a resolution condemning the action of the directors in appointing a manager at a salary of \$200 a month, as contrary to law and the interests of the stockholders. Upon being put to the vote, the resolution was voted down.

THE PIONEER BUSINESS ASSOCIATION of Alaska has perfected its organization and elected the following permanent officers: John F. McGovern of Townsend, McGovern & Co., president; R. A. Wilson of Sisson, Crocker & Co., vice-president; R. B. Kittredge of Neville & Co., secretary; Leon Maison of George W. Hume & Co., treasurer. The association has also decided to instruct Miner W. Bruce, the Eastern representative of the organization, to take steps toward securing the appointment of a Fish Commission for Alaska.

SILVER KING M. CO., Jan. 15.—H. M. Noble, president; George E. Gray, vice-president; Aug. Waterman, secretary.

SIERRA NEVADA M. CO., Jan. 15.—Charles H. Fish, president; A. W. Havens, vice-president, and Con O'Connor, C. Hirschfeld and Herman Zidig, trustees. E. L. Parker was re-elected secretary and D. B. Lyman, superintendent. The secretary's financial report showed a credit of \$26,130.

Appreciative.

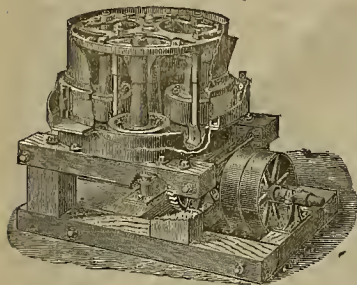
THE MINING AND SCIENTIFIC PRESS, the sturdy friend and advocate of the mining interests of the coast, has entered upon a new volume. The PRESS has done much for the interest it advocates and no miner should allow himself to be without it.—Trinity Journal.

THE San Francisco MINING AND SCIENTIFIC PRESS, the oldest and best paper known to us, has completed its 59th volume.—Prescott (A. T.) Courier.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3.00 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

AN ARMY OF MINERS.—A total of 6175 men are employed in the mines in and about the vicinity of Butte City, Montana. The December pay roll of mines in that vicinity footed up a total of \$617,500. The Anaconda employs 3000 men and pays out monthly \$300,000 for employees' wages. The Boston and Montana and Butte & Boston Companies have a total of 1600 employees on their pay-rolls. The Parrott employs 400 miners and the Colorado and Blue Bird 250 and 300 respectively. The other companies employ from 200 to 75 men each.



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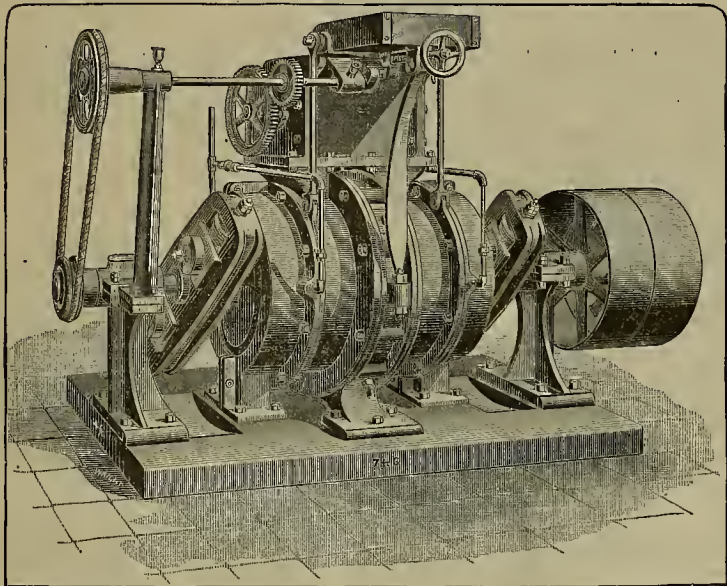
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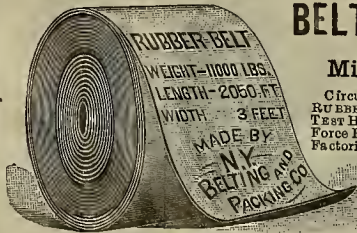
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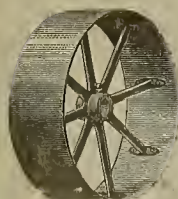
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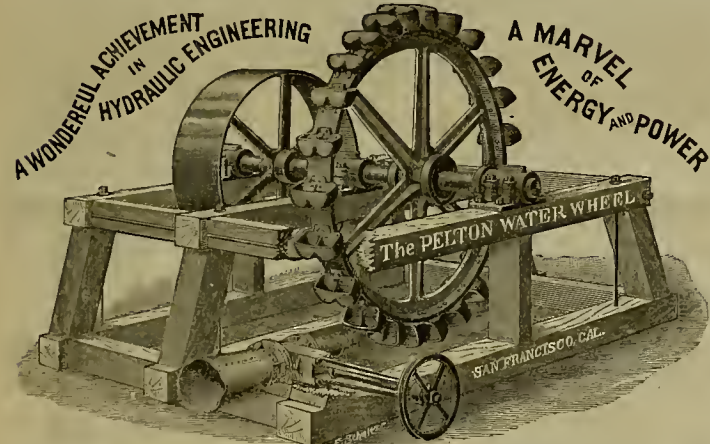
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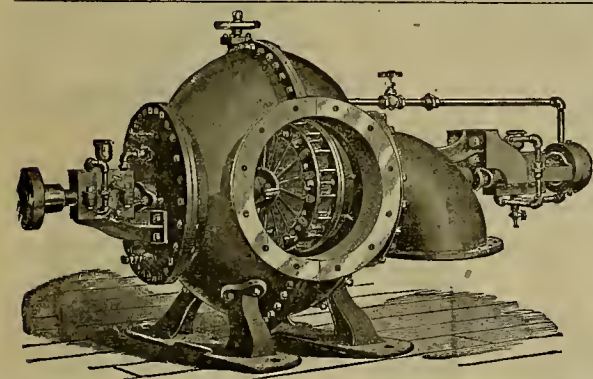
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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, Jan. 16, 1890.

Clear weather the fore part of the week encouraged the trade in the opinion that distributive trade would soon set in, but this has been dispelled by heavy rains at the close. Although merchants, manufacturers, and business men in general are discouraged over the present situation, yet they look forward to a more prosperous year than enjoyed for several years past.

Money is growing easier, with the general impression in financial circles that there will be more ease within a short time than at any time in last year.

The uncertainty regarding what action Congress will take on the silver question is at present a disturbing element in the silver market, which very naturally has its effect on silver mining.

MEXICAN DOLLARS—Liberal stocks and a light demand cause a weak tone. With the spring months a freer demand is looked for. The market has held fairly steady at 75 3/4 to 76 throughout the week.

Mexican dollars closed to-day dull at 76 1/2 cts. asked from first hands.

SILVER—In the local market prices have ruled at New York prices, owing to a light export demand. The Mint is in the market and cleans up supplies fairly well. Yesterday (Wednesday) the market moved up to 97 cents in sympathy with an advance in New York and also abroad. Higher prices for silver were generally based upon the influences heretofore given in these columns. It is reported by telegraph that Secretary Windom is drawing up a bill based on his last report to Congress on the silver situation. It is claimed that he will make a few well-timed changes with a view of making his position still more acceptable to both mono-metalists and bimetalists. It is asserted that the latter are drawing more closely together in favor of free coinage of silver, and failing to get it this session of Congress will insist on the monthly purchases of silver being increased to \$4,000,000.

Cables came through to-day quoting silver in London strong at 44 1/2 d. On this basis, with today's prices for sterling exchange, our market ought to be very near 98 cents. Export buyers quote 97 1/2 cts.

QUICKSILVER—The market is quiet at quotations. Receipts the past week aggregate 146 flasks, and exports by sea 218 flasks to Mexico.

BORAX—Receipts the past week aggregate 300 cts, and exports by sea 25,745 lbs. to New York. The market is steady, with a continued free demand from the East.

LIME—Receipts the past week aggregate 2586 bbls., and exports by sea 350 bbls. to Honolulu. The market is quiet at steady prices.

LEAD—The market is reported essentially unchanged. There is no denying but that there is an uneasy feeling in the market due largely to the uncertainty regarding congressional action in Mexican lead ores. A leading New York paper says that the administration is quietly at work furthering our trade relations with Mexico. That country, in return for the simple establishment of a liberal policy toward her lead-ore product, is willing to open exceptional privileges to this country for her manufactured products of iron, steel, textiles and other articles in the long list of exports of the United States. This Government could afford to pay a bounty to the lead as proposed for the sugar producers, rather than have this single item interfere with the enormous trade which the United States would thus acquire with Mexico. And without some such evidence of friendly and reciprocal action the market which should be opened to the United States will continue to be controlled and occupied by Great Britain and even Germany.

TIN—For spot the market is dull and heavy. Sales from second hand of B. V. plate are reported at \$4.90, and of pig at 22 1/2 and 22 3/4 c. The English market for pig is weak under continued selling pressure. Imports the past week aggregate 33,380 boxes of plate. English cables report tin plate strong and active at a slight advance.

IRON—The local market is reported strong at full prices, but the demand is still slow. The Eastern and European markets continue to be reported active and strong under free consumption. The impression prevails at the East that there will be continued activity in the market for some time to come.

COPPER—The market has held to strong prices throughout the week. Late London cables to the Iron Age report as follows: Copper has ruled strong on the support of good demand for consumption and large speculative purchases. Merchant Bar selling up to £51 17s 6d. Stocks decreased in December about 9000 tons, the greater portion of which represents sales by bankers holding the late syndicate's stock. It is calculated that French financiers have sold during the past nine months 60,000 tons. The stock of Anaconda matte is now about 25,000 tons. About 450 tons were withdrawn from stores in December. The importations of this material into England last year were 19,000 tons. A sale has been made of 1000 tons of argenteiferous Anaconda matte at 10s 6d. The stock of copper decreased last month 2500 tons, and the visible supply 1200 tons. The total supplies received in 1889 were 13,000 tons less and the deliveries 49,000 tons greater than during the previous year.

COAL—Imports the past week aggregate as follows: From Newcastle, N. S. W., 9749 tons; Tacoma, 2200; Coos Bay, 1965; Seattle, 514; Departure Bay, 2300; overland, 30; total, 4558 tons. The consumptive demand continues exceedingly heavy, and had it not been for the large spot supplies, prices would be higher. While agents for coast coals and importers of foreign are bullish in their talk, large dealers and consumers are offish and will not anticipate their wants to any extent except at concessions. As heretofore stated, the large output of the coast collieries is an important factor in keeping prices down.

Eastern Metal Markets.

By Telegraph.

New York, Jan. 16, 1890.—The following are the closing prices the past week:

Silver in Silver				
Thursday	Friday	Saturday	Sunday	Monday
90 1/2	91 1/2	91 1/2	91 1/2	91 1/2
14 50	14 50	14 50	14 50	14 50
3 87 1/2	3 87 1/2	3 87 1/2	3 87 1/2	3 87 1/2
20 50	20 50	20 50	20 50	20 50
14 50	14 50	14 50	14 50	14 50
3 87 1/2	3 87 1/2	3 87 1/2	3 87 1/2	3 87 1/2
20 50	20 50	20 50	20 50	20 50

NEW YORK, Jan. 15.—Borax is without essential change. Quicksilver is dull but fairly steady. Tin has shaded off slightly under realizing sales abroad. Copper quiet and firm. Lake ingot advanced to 14 1/2 c; spot, 14 1/4 c. Futures helped speculators. Arizona, 13 1/4 c; casting, 13 c; London cable, 50 1/2 c per lb. spot. The market is a trifle easier. Pig lead, 3 1/2 c. There was no important trade in futures.

San Francisco Metal Market.

WHOLESALE. THURSDAY, January 16, 1890.

ANTIMONY	25 @	25 @
BORAX—Refined, in carload lots	7 @	7 @
Powdered	7 @	7 @
Concentrated	6 1/2 @	6 1/2 @
All grades jobbing at an advance		
COPPER		
Bulk	21 @	22 @
Sheathing	22 @	24 @
Unroled jobbing	17 @	18 @
do, wholesale	15 @	16 @
Fire Box Sheets	22 @	24 @
LEAD—Pig	4 @	4 1/2 @
Bar	5 @	5 @
Sheet	7 @	7 @
Pipe	6 @	6 @
Shot, discount 10% on 500 bags	1 45 @	1 45 @
Buck, 3/4 bag	1 45 @	1 45 @
Crilled, do	1 55 @	1 55 @
STEEL—English	16 @	20 @
Canton tool	9 @	9 @
Black Diamond tool	9 @	9 @
Pick and Hammer	8 @	10 @
Tool Churn	4 @	6 @
TOE OIL	4 @	6 @
TINPLATE—B. V. steel grade, 14x20, P. S.	5 50 @	5 50 @
B. V. steel grade, 14x20, spot	4 75 @	5 00 @
Oharcold, 14x20	6 75 @	7 00 @
do, roofing, 14x20	6 00 @	6 00 @
do, do, 20x28	12 @	12 @
Pig tin, spot, 3/4 lb.	22 @	22 1/2 @
COKE—Eng. ton, spot, in bulk	13 50 @	15 00 @
do, do, to load	13 00 @	13 00 @
QUICKSILVER—By the flask	47 00 @	47 50 @
Flasks, new	35 @	35 @
Flasks, old	30 @	30 @
CHROME IRON ORE, 1/2 ton	10 00 @	10 00 @
IRON—Bar, heavy	4 @	3 1/2 @
Norway, base	4 @	3 1/2 @
IRON—Glengarnook ton	35 00 @	35 00 @
Elington, ton	35 00 @	35 00 @
American, 80, No. 1, ton	33 00 @	33 00 @
Oregon Pig, ton	33 00 @	33 00 @
Puget Sound	35 00 @	35 00 @
Clay Lane White	27 @	27 @
Shotts, No. 1	35 00 @	35 00 @
Iron (base price) 1/2 lb.	34 @	34 @
Langdon	35 00 @	35 00 @
Thorncliffe	35 00 @	35 00 @
Gartcherrie	35 00 @	35 00 @

Lumber.

Pine, Fir and Spruce.

ROUGH PINE, merchantable, 40 ft.	20 00 @	20 00 @
41 to 60 ft.	21 00 @	21 00 @
61 to 80 ft.	23 00 @	23 00 @
61 to 70 ft.	27 00 @	27 00 @
1x6, fencing	19 00 @	19 00 @
1x4	21 00 @	21 00 @
1x3, 1x4 and 1x6, odd lengths	19 00 @	19 00 @
Second quality	17 00 @	17 00 @
Selected	24 00 @	24 00 @
Clear, except for flooring	31 00 @	31 00 @
Clear for flooring	2 00 @	2 00 @
Clear V. G. No. 1 flooring	6 00 @	6 00 @
Firewood	14 00 @	14 00 @
Dressed Pine, flooring, No. 1, 1x6	22 00 @	22 00 @
No. 1, 1x4	30 00 @	30 00 @
No. 1, 1x4, 1x6, and odd sizes	37 00 @	37 00 @
All sizes, No. 2	27 00 @	27 00 @
Stepping, No. 1	44 00 @	44 00 @
Stepping, No. 2	34 00 @	34 00 @
Ship timber and plank, rough	27 00 @	27 00 @
Selected, planed 1 side, 4x8 40 ft.	29 00 @	29 00 @
" " " " " "	31 00 @	31 00 @
" " " " " "	31 00 @	31 00 @
" " " " " "	36 00 @	36 00 @
Deck plank, rough, average 36 ft.	35 00 @	35 00 @
Dressed, average 35 feet	40 00 @	40 00 @
Pickets, rough, B. M.	20 00 @	20 00 @
4x12, 4 ft long, B. M.	6 50 @	6 50 @

Coal.

TO LOAD.	Per Ton.	Per Ton.
Australian	7 60 @	7 75 @
Liverpool S'm	8 50 @	8 50 @
Scotch Splint	9 00 @	9 00 @
Cardiff	9 50 @	10 00 @

SPOT FROM YARD.	Per Ton.	Per Ton.
Wellington	9 00 @	9 00 @
Scotch Splint	9 00 @	9 00 @
Crest	9 00 @	9 00 @
Westminster Bymh.	9 00 @	9 00 @
Napamio	9 00 @	9 00 @
Sydney	8 00 @	8 00 @
Gilman	7 00 @	7 00 @

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Commonwealth, Jan. 13, \$20,000; Con. California and Virginia, 11, \$44,870; Hanauer, 7, \$3400; Germania, 7, \$4237; Savage (for December), \$29,429; Hale and Norcross (for December), \$71,607; Hanauer, 8, \$3550; Germania, 8, \$2042; Hanauer, 9, \$2950; 10, \$3100; 11, \$3000.

Our Agents.

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E. H. SOLE—Plymouth Co.
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E. E. DEMING—Oregon.

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COMPANY.	LOCATION.	No.	AM'T. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.	
Adelaide Copper M Co	Nevada	1	Dec 31	Jan 31	Feb 28	W H Graves	426 Sansome St	
Belle Isle M Co	Nevada	13	15 Dec	Jan 8	Jan 30	J W Pew	310 Pine St	
Best & Belcher M Co.	Nevada	13.	15 Dec	Jan 8	Jan 30	J W Pew	310 Pine St	
Bullion M Co	Nevada	36	23 Dec	Jan 8	Jan 24	R R Grayson	327 Pine St	
Boile M Co	California	11.	25 Nov	Dec 17	Jan 22	H L Burling	303 Montgomery St	
Booth G M Co	California	4	25 Nov	Dec 23	Jan 20	GEO R Spang	303 Montgomery St	
Camp Creek M & M Co	California	1	2 Dec	Dec 20	Feb 12	Mar 10	A S Polyard	213 Fremont St
Con New York M Co.	Nevada	2.	15 Dec	Jan 15	Feb 5	C E Elliott	303 Montgomery St	
Con St Gothard M Co	California	1.	6 Jan	Jan 14	Feb 17	Mar 10	T Wetzel	522 Montgomery St
Chaquever M Co	Nevada	23.	25 Dec	Jan 21	Feb 1	C E Elliott	303 Montgomery St	
Golden Giant M Co	California	1	4 Dec	Jan 23	Feb 12	H L Briggs	303 Montgomery St	
Kentuck M Co	Nevada	20	30 Dec	Jan 14	Feb 4	J W Pew	310 Pine St	
Mayflower Gravel M Co.	California	45.	50 Dec	Feb 27	Feb 3	Feb 25	J Morizio	328 Montgomery St
Mexican M Co	Nevada	59.	25 Dec	Jan 27	Feb 18	C E Elliott	303 Montgomery St	
Mineral King M & M Co.	Arizona	4	10 Jan	Jan 10	Feb 10	Mar 3	P H Leonard	413 California St
Mono G M Co	California	23	25 Nov	Dec 23	Jan 24	B L Burling	303 Montgomery St	
North Occidental G & S M Co	Nevada	1.	7 Dec	Jan 2	Jan 27	Feb 10	W H Watson	302 Montgomery St
Natoma Water & M Co	California	2.	5 Dec	Jan 21	Jan 28	Feb 25	P W Ames	616 California St
Overman S M Co	Nevada	4.	25 Dec	Jan 31	Feb 5	Feb 26	D Edwards	414 California St
Palisade M Co	Nevada	2.	5 Nov	Dec 1	Dec 26	Jan 30	D Buck	303 Montgomery St
Seg Belcher & Mides M Co.	Nevada	5.	25 Jan	Jan 4	Feb 6	Feb 21	E B Holmes	303 Montgomery St
Trinity River Tunnel & M Co.	California	2.	50 Nov	Nov 27	Jan 6	Jan 23	L H Packman	28 California St
Tetrahoff M Co	California	3.	1 Dec	Jan 14	Jan 21	Feb 14	W J Garrett	303 Pine St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Bald Mt Extension M Co	California	W Grear	Downville	Annual	Jan 23
Chicago M & M Co	California	W Grear	309 Montgomery St	Annual	Jan 20
Crocker M Co	California	A Waterman	309 Montgomery St	Annual	Jan 20
Del Monte M Co	Nevada	J W Pew	310 Pine St	Annual	Jan 29
Lucky Hill Con M Co	California	P D Black	Baldwin Hotel	Annual	Feb 13
Merrimac M Co	California	R W Heath	318 Pine St	Annual	Jan 23
North Commonwealth M Co	Nevada	J W Pew	310 Pine St	Annual	Jan 23
Natoma W & M Co	California	P W Ames	616 California St	Annual	Jan 23
Nevada Salt & Borax Co	California	H C Van Wyck	310 Pine St	Annual	Jan 21
Spring Valley M & Irrigation Co	Cal.	W E Davis	402 Front St	Annual	Jan 20
Sulphur Basin Quicksilver M Co	Cal.	T Wittingham	306 California St	Annual	Jan 20
Utah Con M Co	California	A H Fish	303 Montgomery St	Annual	Jan 29
Utah Con M Co	Nevada	A H Fish	303 Montgomery St	Annual	Jan 29

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Champion M Co	Nevada	T Wetzel	322 Montgomery St	10	Jan 5
Caledonia M Co	Nevada	A S Cheminant	328 Montgomery St	08	Jan 5
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	60	Jan 10
Derbec Blue Gravel M Co	California	T Wetzel	322 Montgomery St	10	Dec 23
Idaho M Co	California	A H Fish	303 Montgomery St	6	Nov 7
Mt Diablo M Co	Nevada	R Heath	319 Pine St	30	Oct 24
Pacific Borax Salt & Soda Co	California	A H Clough	230 Montgomery St	1 00	Jan 10

Mining Share Market.

The mining share market the past week was only fairly spasmodically active, with hardly perceptible fluctuations in the Comstock. The dull, depressed market, with reliable private information from the mines hard to get, suggests that it is done to secure all the stock possible, preparatory to an upward move. This (Thursday) morning the market opened very dull but at fairly firm prices; after Board call prices strengthened, with Yellow Jacket, Belcher and Crown Point the leaders. In outside stocks the Tuscara was more active, with an attractive up move, followed by a 20 per cent setback. The Quijotas were dull. In Bodie there was a little more doing, doubtless due to a report current that there would be a change in the superintendent and a cutting down in the salaries of the officials, which was done at a special meeting of the directors held on yesterday. Usually well-informed parties look for still lower prices in the Bodie stock, owing to a report of the necessity of another assessment later on.

From the mines reliable private information is hard to get. The latest information confirms previously received advices of an important development in Belcher on the roof-level level when work was stopped. Work will be, or has been, commenced on the roof-level to tap the fire lower down. The ore is said to be high grade. In another Gold Hill mine a ten-foot body of rich ore was run into on an upper level, but no official mention made of it. Why it is that information of the above character is kept back is beyond our ken. It should undoubtedly receive attention from some quarter. Outside stockholders have some rights, and to keep informed on the work in the mines is one of them. The mining superintendents get large enough salaries to take time to add a few more words to their skeleton and unsatisfactory weekly reports, so as to give fuller information. A report is current among well-informed persons of a strike in one of the North End mines, but we have not been able to get the news confirmed up to this writing. Official letters received to-day (Thursday) from Hale and Norcross report higher battery assays and very important work going on in the mines. From Belcher the letter goes out of the way to mention everything except that which is wanted. From Crown Point no ore was milled, owing to the freeze-up; this caused the temporary discharging of over 50 miners. The prospecting work in the mines is still continued. From Con. Imperial an improvement is reported in the crosscuts. Overman is reported to be stopping a higher grade of ore. From the outside mines there is nothing new to report outside of official letters. The change in the superintendency of the Bodie mine is looked upon as being more favorable for that mine. The Bulwer and Standard mines are running out bullion. Private advices from the Tuscara report that Commonweath will make another shipment of bullion by telegraph soon. Owing to their size, these shipments are to be made every few days. The news from the mines is of a very promising character and augurs well for the future. From the Quijotas nothing new is to hand. The annual report of the Silver King Mining Co. is of a flattering character. Extensive work was done in last year and the mine put in position for better working this year.

THE Anaconda and St. Lawrence mines, Montana, were opened last week, but had to be closed again, as the fire is still raging in their depths. No attempts have been made to recover the five bodies known to be in the mine. It is thought the company will now either attempt to flood the mine or subdue the fire by the injection of carbonic acid gas. The latter will probably be resorted to, as the former would be difficult on account of the enormous extent of the workings and the scarcity of water.

THE Con. California and Virginia Mining Co. has placed on special deposit the sum of \$22,836, the amount due for royalty on ore extracted from the mine since suit was brought against the Comstock Tunnel Company by holders of Sntro-tunnel stock. This money will be paid over as soon as the court decides which of the litigants is entitled to receive it.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Dec. 25.	WEEK ENDING Jan. 2.	WEEK ENDING Jan. 9.	WEEK ENDING Jan. 16.
Alpha.....	.80	.95 1.00	1.15 .95	1.05 .90
Alta.....	1.25	1.30 1.30	1.31 1.25	1.20 1.25
Andes.....	.40	.45 .60	.60 .50	.50 .50
Belcher.....	1.85	2.15 1.81	2.23 1.65	1.85 1.70
Best & Belcher.....	2.35	2.50 2.30	2.85 2.10	2.35 2.25
Bullion.....	.30	.40	.25	.60 .55
Bulwer Con.....	.65	.50	.45	.40 .45
Benton.....	.25	.25	.25	.25 .25
Bulwer.....	.25	.25	.25	.25 .25
Challenger.....	4.00	4.70	5.40	4.8 4.34
Chollar.....	1.10	1.25 1.30	1.50 1.10	1.20 1.10
Chollar.....	2.15	2.45 2.35	2.75 2.26	2.45 2.20
Concordance.....	.31	.40	.45	.32 .25
Con. Imperial.....	.20	.30	.35	.25 .30
Caledonia.....	.15	.25	.30	.25 .30
Crown Point.....	1.50	1.90 1.60	2.01 1.50	1.75 1.50
Crocker.....	.26	.25	.30	.25 .20
Eureka Con.....	.25	.25	.30	.25 .20
Eschschuer.....	.35	.35	.35	.35 .35
Grand Prize.....	.35	.65	.60	.75 .65
Gould & Curry.....	1.30	1.50 1.35	1.65 1.30	1.40 1.34
Hale & Norcross.....	2.30	2.55 2.50	2.85 2.60	2.75 2.70
Julia.....	.30	.30	.35	.25 .35
Justice.....	.25	1.25	1.01 1.20	1.15 1.30
Kentuck.....	.55	.60	.30	.35 .70
Lady Wash.....	.30	.35	.35	.30
Mex.....	.40	.45 .40	.30	.35 .35
Mex.....	2.20	2.60 2.35	2.80 2.10	2.30 2.10
Najavo.....	.25	.35	.40	.36 .40
North Belle Isle.....	1.10	1.20 1.00	1.01 1.05	1.25 1.05
New Queen.....	.55	1.01 1.00	1.10 1.15	.95 .95
Old Central.....	3.00	3.50 3.50	3.75 3.50	3.50 3.50
Ophir.....	3.05	3.60 3.30	3.90 3.50	3.50 3.65
Overman.....	.80	.75 70	.80 55	.70 55
Potosi.....	1.75	1.90 1.90	2.20 1.65	1.85 1.70
Pearless.....	.35	.35 .35	.35 .25	.25 .25
Pearl.....	.75	.75 .75	.75 .75	.75 .75
Savage.....	1.40	1.55 1.40	1.80 1.40	1.55 1.40
S. B. & M.....	.76	1.15 1.10	1.31 .85	1.20 1.00
Sierra Nevada.....	1.75	2.00 1.85	2.25 1.75	1.95 1.80
Sierra Nevada.....	.15	.45	.30	.35 .35
St. Mary's.....	.10	.15	.30	.35 .35
Union Con.....	2.10	2.40 1.15	2.60 2.10	2.30 2.05
Utah.....	.60	.65	.70	.55 .60
Weldon.....	.20	.20	.20	.20 .20
Yellow Jacket.....	1.70	2.35 1.95	2.20 1.80	1.95 1.70

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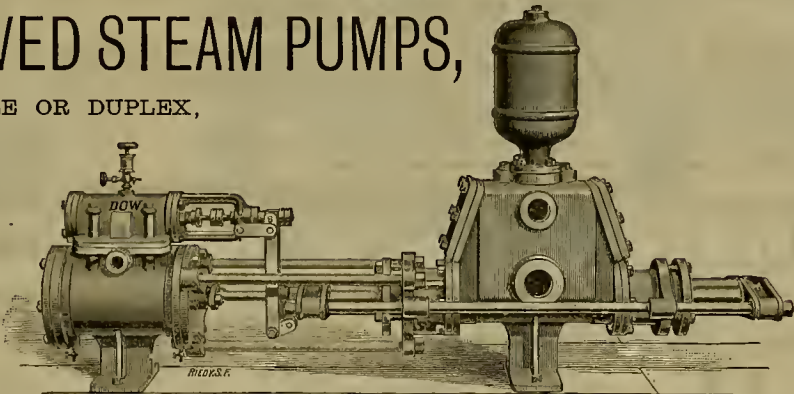
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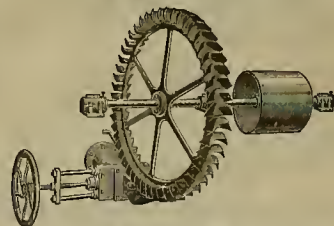
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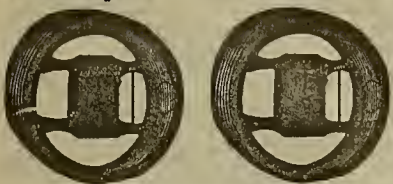
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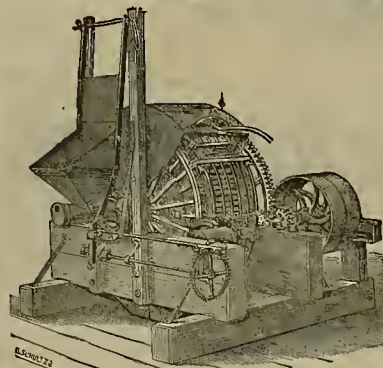
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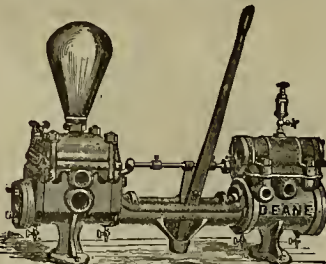
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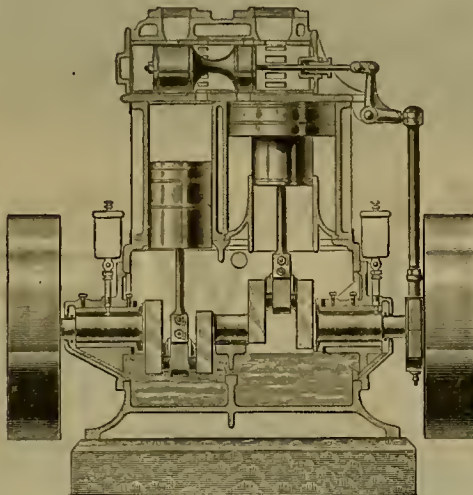
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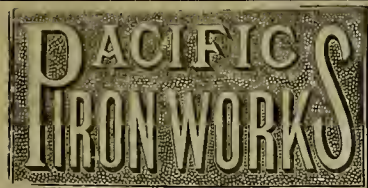
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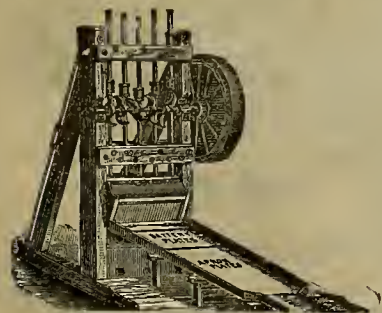
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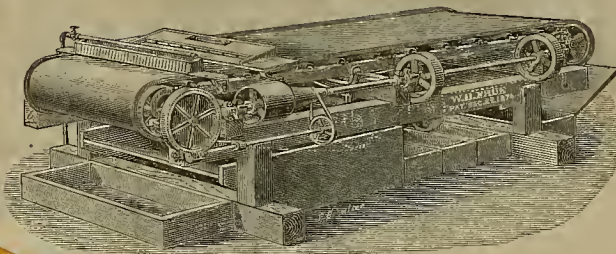
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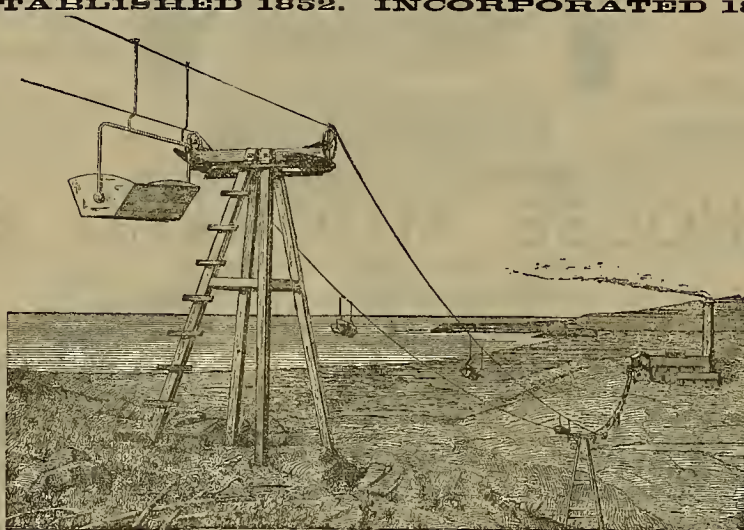
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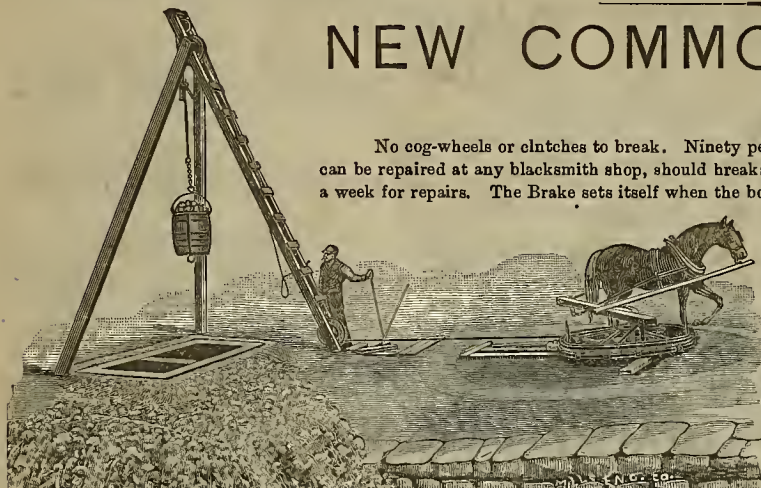
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SAN FRANCISCO, SATURDAY, JANUARY 25, 1890.

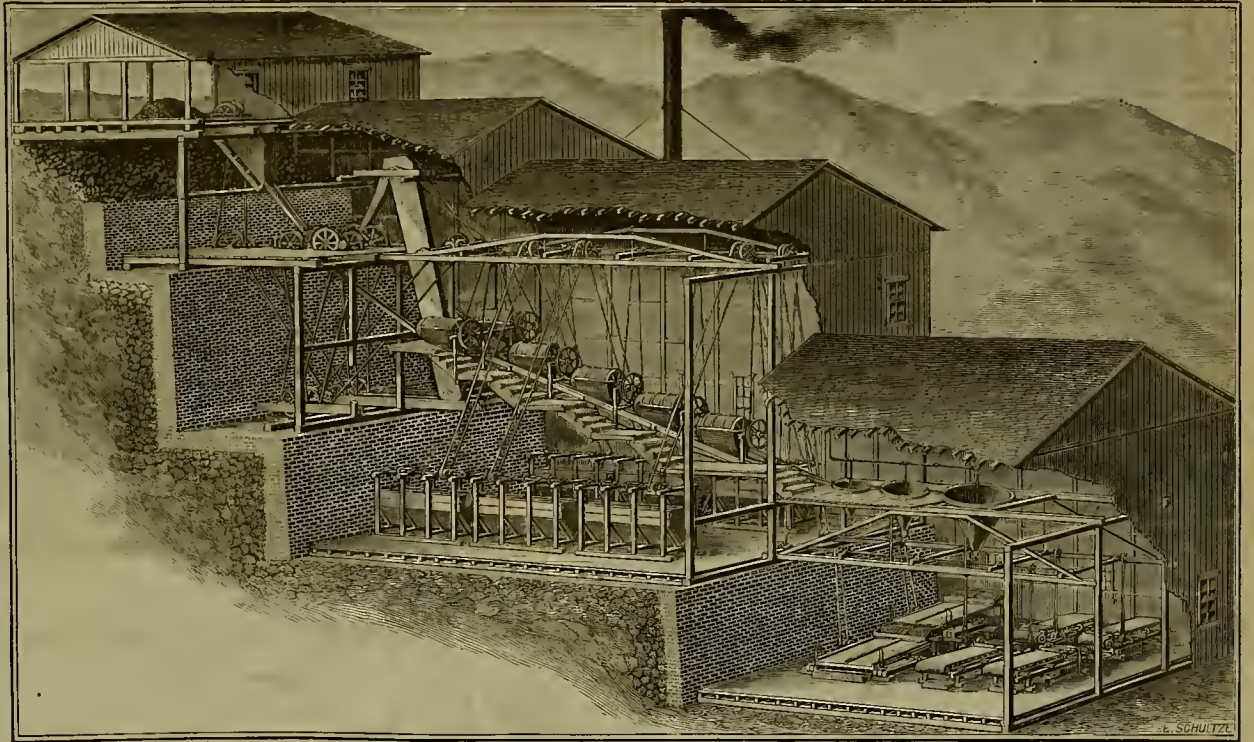
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Concentration of Ore.

A modern concentrating mill incloses a good many forms of machinery by which ores are prepared for subsequent metallurgical treatment. The operation of concentration and dressing is based on the difference of specific gravity of the mineral constituents of an ore, by virtue of which the minerals have unlike velocities in falling through water (or other medium). Water is preferably the separating medium. An improved concentrating plant, such as is made by the Union Iron Works of this city, is shown on this page. The coarse crushing of the ore is done by rock-breakers, and the "screenings" or coarse stock from the rock-breakers is further comminuted by rolls or stamps. But for this purpose rolls are preferable inasmuch as their use minimizes the amount of slimes incident to crushing.

From the rolls the ore passes into the first (largest and coarsest) of the series of five revolving screens or "trommels." The trommels are either cylindrical or conical in form. In the former class the conveyance of the "screenings" from the delivery end to the discharge end of the trommel is effected by the inclination given to the axis of the trommels. In the latter class this is attained by virtue of the conical shape of the trommels. The screenings drop through "spouts" into the jigs, which have sieves corresponding in mesh to those of the delivering trommels. The trommels have sheet-iron receiving aprons into which the ore falls after passing through the perforations of the screens. Through these aprons the ore is delivered to the next finer sieved trommel of the series.

The ordinary type of jig is a trough-shaped water-box divided into two compartments by a partition extending part way down. In some of the compartments is a loosely-working plunger operated reciprocally. In the other compartment is a fixed horizontal screen on



SECTIONAL VIEW OF MILL FOR CONCENTRATING AND DRESSING ORES.

which the sized ore is fed. The strokes of the plunger cause a pulsation of water through the sieve. The ascending current raises the mixed particles, which, in their descent through the water, arrange themselves in layers or leads.

The sorting of the "equal-falling" minerals takes place in a series of inverted pyramidal boxes called "Spitzkasten." Water is brought to each compartment from above by a pipe, which, discharging the water downward against the bottom of the box, produces an ascending current. This ascending current prevents the deposition of the lighter particles,

which are consequently carried over into the next box in the series. These boxes are so arranged as to cause a slowly flowing current throughout the series.

Where the system of hydraulic classification is more extended, a series of boxes is used under proper conditions as to size, velocity of current produced, etc., for the separation of the sands. From these boxes the slimes retained in the current goes to the slime classifiers.

When jigging is not practicable on account of the extreme fineness of the slimes, the pulp is worked on round tables, huddles, percussion

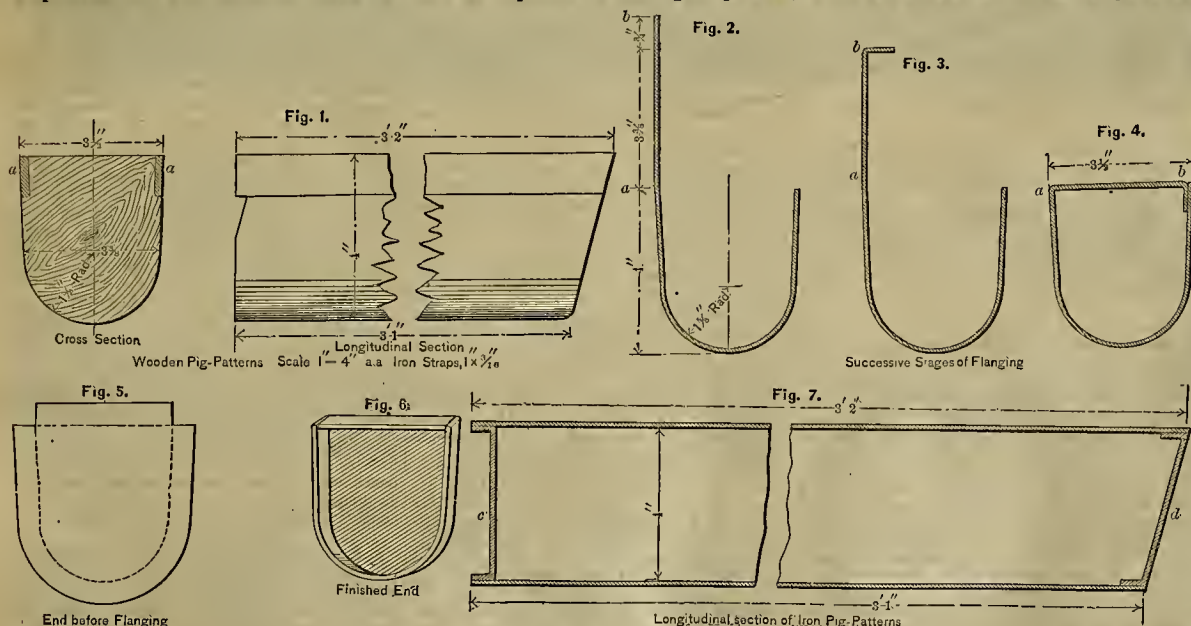
tables, Triumph and Frue vanners, etc. A sizing is effected by these machines. The larger particles (specifically lighter) being acted upon more readily by the flowing water, are carried down the incline planes and pass away as tailings, while the smaller (specifically heavier) particles remain as concentrates.

Hollow Iron Pig Patterns.

They have in use at the Durham furnaces in Pennsylvania a set of hollow pig patterns made of iron instead of the usual ordinary wooden patterns. The iron pattern is more durable and cheaper in the long run. In describing this before the American Institute of Mining Engineers, Mr. B. F. Fackenthal, Jr., says: The iron pattern is made of the best flange iron, No. 13 gauge. After the sheets have been cut to the proper size, three heats are required for flanging. At the first heat each piece is stamped in a cast-iron form, which gives the proper shape to the bottom part of the pattern, as shown in Fig. 2. At the second heat, it is flanged at *b*, as shown in Fig. 3. At the third heat, it is flanged at *a*, giving the pattern its final shape, as shown in Fig. 4. The flanging at *a* and *b* is done on a square mandril. These corners should be full and square. It now remains only to put the pattern together and put the heads or ends in. The ends are also made of No. 13 flange iron and are stamped in a cast-iron form or die by means of an old screw-punch, the iron being cut to the proper shape before stamping, as shown in Fig. 5.

These ends can be made very quickly, only a few seconds being required for the stamping. The finished end is shown in Fig. 6 and at *c* and *d* Fig. 7.

The end farthest from the sow, and marked *d* in Fig. 7, is of course put in first. The end next to the sow is then put in with the flanged part to the outside, as shown at *c* in Fig. 7.



HOLLOW IRON PIG PATTERNS.

Gold-Panning Machine.

There was teeted this morning, says the San Diego Sun, at Sanger & White's machine-shop, at the foot of Eighth street, a new invention for panning gold out of gravel that seems destined to take a front rank in the economical extraction of the precious metal. This machine consists of a long cylinder body, perhaps 18 inches in diameter and 20 feet in length, in the center of which a set of iron teeth operate after the manner of a harrow. The gravel is shoveled into this at one end, and by the time it passes to the other end of the cylinder, it has received a thorough pulverizing. Here the gravel passes out of the cylinder to a series of plates, these plates (connected with one another in terraced form) being operated by a movement which is very much after the manner of band-panning. The movement seems to quite thoroughly segregate the gold from all foreign substances, but when a small residue of gravel is left, it is carefully removed and panned out by hand. The gold from many tons of dirt after once passing through the machine, is obtained from one panning.

In the course of the experiments with this new invention, about \$20 worth of fine gold dust was distributed in about ten tons of dirt and the machine turned it all out safely again with a loss of only about five per cent, and even this loss will be easily remedied. The machine will cost about \$200, can be operated by a four-horse power engine and boiler, and has a capacity of 100 tons of dirt a day. The inventor is a miner named McDuffy from near Campo.

[The same idea has been carried out in this State years ago, the revolving cylinder, however, being much larger in diameter, and having a screw-flange from end to end, to pass the material along. It was used to work auriferous gravel, which was more or less "cemented" together.—EDS. PRESS.]

The Local Mint.

The following is Coiner Gorham's report of the coinage at the local Mint for December last, and also for the year 1889:

	For December.	Jan. 1 to Dec. 31.
Double eagles.....	\$1,341,000	\$15,444,000
Eagles.....	14,000	4,254,000
Standard dollars.....	500,000	700,000
Dimes.....		97,267

Totals.....\$1,855,000 \$20,495,267

No coins were made last July, owing to the change in the office of superintendent, W. H. Dimond succeeding Mr. Lawton. The coinage of the other months varied from \$1,390,000 in June to \$2,630,000 in August. The coinage for the year is about \$5,000,000 less than in 1888. The coinage for the past five years amounts to \$121,262,733, an average of over \$24,000,000 per annum. The San Francisco Mint was established in 1854, and the amount of coin turned out from the start to December 31, 1889, is as follows:

Gold coin.....	\$739,321,857
Silver coin.....	114,653,887
Total.....	\$853,975,744

The above is California's contribution to the world's stock of gold and silver coins.

DEATH OF EMLEN PAINTER.—Prof. Emlen Painter, president of the American Pharmaceutical Association, and one of the trustees of the New York College of Pharmacy, died of consumption at his home at Spuyten Dyvil, January 15th. Prof. Painter was born at Concord, Pa., in 1844. His parents were leading members of the Society of Friends, and Emlen was educated at the Friends' College in Wilmington, Del. He was also a graduate of the Philadelphia College of Pharmacy in the class of 1866. After graduating he removed to San Francisco in 1876, and was elected Professor of Physics in the San Francisco College of Pharmacy, and subsequently was president of the college. In July last, at the Convention of the American Pharmaceutical Association, held in San Francisco, he was unanimously elected president of the association, and two months later he was appointed to represent the State of California at a convention for the revision of the United States Pharmacopoeia to be held at Washington in the fall of the present year.

FROM A "WORKED OUT" MINE.—The North Star Mining Company, operating in this district, has declared dividend No. 5 of 50 cents a share, aggregating \$50,000. This makes \$250,000 in dividends paid by the North Star under the present management. And this mine was shut down years ago, "worked out." Yet it has within three or four years been re-opened, supplied with a hoisting and pumping plant and 40 stamp mill second to none in the State, in addition to paying a quarter of a million in dividends! Between 150 and 200 men are given employment. The Empire, Omaha and Hartery are also shining examples of "worked-out" mines.—*Grass Valley Tidings.*

DURING the month of December last there were shipped over the Eureka & Palisade railroad the following from the mines of Eureka district: Sixty tons of Richmond lead, 180 tons of crude hullion and 534 tons of ore.

Mining Bureau Museum.

Among the recent contributions to the Museum of the California State Mining Bureau are the following:

Azomite, in very large and handsome crystals, from Bisbee, Arizona, and native copper with chalcocite from the same locality; presented by D. L. Mosgrove.

Topaz from Colorado; F. E. Monteverde. Several specimens of gold and silver ores from various mines; W. H. V. Cronise.

Five specimens of gold quartz from as many different mines in Amador county, Cal.; W. Q. Mason.

Rich copper ore, Monterey county, Cal.; F. Stone.

Rich copper ore, Alaska; Dr. E. Von Hase-löcker.

Fluorite, San Bernardino county, Cal.; Jas. H. Boyd.

Specimen of good quality from a large deposit in Ventura Co., Cal.; F. S. Hall.

Placer gold of very peculiar form, Palmetto, Esmeralda Co., Nev.

Gold in limonite, Fresno Co., Cal.; J. E. Hutchinson.

Group of mica crystals, Harney Peak, Dakota; R. D. Atkins.

Copper ore and chromite iron, Fifteen-Mile House, Santa Clara Co., Cal.

A large number of specimens of gold and silver ores, etc., from San Bernardino Co., Cal.

Aragonite (onyx marble), granite and other building stones from San Bernardino Co., Cal.

Crystallized gold on quartz crystals, Lovelock, Butte Co., Cal.

Cummingtonite from near Daggett, Cal.

Asbestos from near Barstow, Cal.

Almandine garnet with crystallized magnetite, Kern Co., Cal.; A. Blano.

Chromite mica—fuchsite—Aroh Beach, Orange Co., Cal.; H. S. Goff.

Realgar in calcite, Trinity county, Cal.; J. S. Thompson.

Stream tin, Potato Gulch, South Dakota; Joseph Swett.

Asbestos, Orange River, South Africa; R. H. Jones.

Prehistoric pottery from ancient graves at Turbigo and Labano, Andes Mts., U. S. of Colombia; D. T. Hughes.

Pseudinite, San Bernardino Co., Cal.

Eight specimens Pennsylvania granites; J. Z. Davis.

Malachite, polished; John Curry.

Gold in jasper and calcite, Alford mine, San Bernardino Co., Cal.

Three fine slabs of polished marble, California Marble and Building Stone Co., Colton, Cal.; also a very handsome slab of polished aragonite.

Fine terra-cotta medallion; Gladding, McBean & Co.

Cinnabar, very rich, Prescott, A. T.; G. K. W. McNara.

Minium, Tulare Co., Cal.; M. B. Everman.

Fine specimens of Colemanite, Calico, Cal.; Mrs. Perry.

Five interesting mineral specimens from Eastern States; D. C. Stone.

Twenty ethnological specimens from San Nicholas island, Ventura Co., Cal.

Bismutite and bismuthinite with gold, Oasis, Mono Co., Cal.; George B. Terrell.

The following have been donated by J. Z. Davis:

Montmorillonite, Auburn, Maine.

Ten specimens stone axes, Santa Fe, N. M.

Pickeringite, Tarapaca, Chili.

Calcite, "hacked" with micaceous iron, Cumberland, Eng.

Aluminum, cast and wrought.

Silicified wood, section from the Arizona petrified forest, polished.

Iceland spar, fine specimen.

Pyrite, Dux, Bohemia.

Tetrahedrite, Kapuick, Hungary.

Decolizite, New Mexico.

Dolomite, Cumberland, Eng.

Limonite, Siegen, Prussia.

Brochantite, Frisco, Utah.

Marcasite, Guanajuato, Mexico.

Marcasite, Lyme Regie, Eng.

Barite, Penn.

Crystallized quartz and agate, large polished specimen.

Two very handsome specimens of onyx, polished.

Four large and very beautiful specimens of agate, polished.

Gold quartz, very rich, Peterson mine, Cargo Muchacho district, San Diego county, Cal.; Thos. E. Frezer.

LEADVILLE AND ASPEN.—Aspen's output of silver and lead during the year 1889 amounted to nearly \$7,500,000. Leadville figures up to more than \$13,000,000. The latter camp always claims everything shipped from her smelters and we presume she has done the same this year. We have not made a close estimate of the amount that Aspen furnished to the smelters of our sister camp, but during much of the time, one-half and often more than one-half of the weekly output was consigned to them. It may thus be safely asserted that nearly \$3,000,000 of the amount which Leadville claims was furnished by Aspen. Her receipts from other points must also have been considerable, and it is probable that the production of the mines of that camp did not amount to more than \$9,000,000, or about the same as they produced in 1888. The increase claimed over last year's figures is all accounted

for by the increased importations from the Silver Metropolis. We have no desire to pull Leadville down, but it is our duty to expose her when she seeks to make a strained contrast between herself and our own city. During 1890 Aspen will produce more than \$9,000,000, and unless Leadville secures a bona fide increase, she will have to yield first place to her rival on this side of the range.—*Aspen Times.*

Comstock Tunnel Company.

Theodore Sutro, president, makes the following statement of the financial condition of the Comstock Tunnel Company, December 1, 1889:

Total indebtedness, \$3,000,000, covered by 30-year first mortgage non-accumulative bonds, of which \$2,139,000 have been issued; surplus cash, \$115,000. The uncollected royalty due in October and November, 1889, amounts to about \$34,000. Gross receipts from the property (including money received from the mining companies for making certain new connections with the mines) for the 12 months ending Sept. 1, 1889, were \$261,133.02; operating expenses in Nevada (not including the cost of the aforesaid new connections) during the same period, \$88,994.32.

As regards the future, it is stated that the average receipts per annum for the three years ending Sept. 1, 1889 (including money received for the aforesaid new connections during the same period) were \$276,915.67; average operating expenses in Nevada during the same period (including cost of aforesaid new connections) were \$83,337.38. As no new connections or any magnitude with the mines are in contemplation for the coming year, it is estimated that the income for the year ending September 1, 1890, will probably be about \$265,000. The operating expenses will probably not exceed \$70,000; other expenses outside of Nevada, \$14,000, making a total of \$84,000. Net income for 1890, about \$181,000; interest on bonds the current year, \$85,560; net surplus above expenses for 1890, \$95,440; surplus available for the redemption of bonds, paying dividends and extending the tunnel at the close of the fiscal year, Sept. 1, 1890, will be about \$210,440.

The Trusts and Combines.

Continuing briefly the comments in previous issues upon the baneful power of the trusts and combines which are operating in agricultural products, we note a despatch on Jan. 13th from Kansas City, which announces that the American Live-Stock Commission Company will disband within a few days. This company was organized about a year ago for the purpose of saving members the money they were paying to commission men in Kansas City and Chicago. A hundred thousand dollars was recently divided as the first year's dividends.

A prominent member of the association says Armour, Swift and Hammond have threatened to boycott the concern in the interest of the brokers. The Kansas City and Chicago Live-Stock exchanges also threaten to do the same thing by the Chicago and Alton Railway if it continues to lease the cars of the association. Thus the great combine is killing out opposition to the middlemen who work in its interest, and tightens its grip upon common carriers, so that the public avenues of transportation cannot be available to parties outside the combine. There is a little gleam of hope that the ways of the trusts may be made hard in the depression in trust circles in New York over the injunction preventing them from changing their form to avoid recent laws; also over the decision of Judge Wallace of San Francisco. The public should congratulate itself that there are some things which promise to check the progress of these gigantic evils.

AN IMPORTANT CASE.—A case of more than usual interest has been commenced in the Superior Court by J. E. Prewett, attorney for plaintiffs, not only on account of the large amount of money and property involved, but also on account of the important land questions to be determined. The suit is to recover a tract of very valuable mining land situated near the Mayflower mine, on the Forest Hill divide, together with \$51,000 rents and profits. Judge Spear and W. H. Bullock own the mine under the mining laws, and the Mayflower Company claims it under a patent to the railroad company. The land has been known to be mineral land from 1860 down to the present, and the determination of the question will be of interest to many miners in all parts of the mining regions as to whether the railroad company can acquire a valid patent to land known to be mineral at the time of the passage of the railroad grant in 1862. The Mayflower Company is in possession of the property and is the defendant in the suit; and W. H. Bullock, Judge Spear, J. S. Rees and R. Greenwood are the plaintiffs.—*Placer Republican.*

THE MINERS' UNION in Virginia City has elected the following officers for the first six months of the ensuing year: President, Michael J. Owens; vice-president, Daniel McFadden; recording secretary, M. Norton; financial secretary, Bernard Coyle; treasurer, C. E. Mack; conductor, Jerome Quinlan; warden, W. B. James; Library Directors—Michael Carroll, Henry Hatherell, Levy Atkinson, James Donworth, Peter Malloy; Finance Committee, John Finnegan, M. Abrams, T. W. Flynn.

Drugs and Doctors.

It was the remark of the celebrated Dr. Boerhaave that the physicians in his day were like a blind man armed with a club; they raised the club and struck; if they hit the disease they killed it; if they hit the patient they killed him. It is surely a matter of gratification that human life and health in our day are subject to no such blundering and uncertainty. Dr. George M. Gould in the December number of the *Forum* speaks almost rapturously of the wonderful advancement medicine has made as a science. He says: "If one thoroughly conversant with the medical progress of the last few years takes up even the best work on pathology or general medicine issued five or ten years ago, he is astonished to find how much seems old and outgrown." He states it as a fact that the death rate in England from zymotic diseases had been reduced one-half, and in the class called fevers within the past 20 years the death-rate had been reduced from 20,000 to 5873.

While we willingly acknowledge the debt of gratitude we owe the medical profession for their tireless energy in improving the healing art and its handmaid, sanitation, still there are many of the profession who are very skeptical, if not pessimistic, in their estimate of power over disease. Dr. Holmes once made the remark that if the whole *materia medica* were cast into the sea, it might be worse for the fishes, but would certainly be better for man. Dr. George K. Weloh of Keyport, N. J., in an address before a medical school on "Many Drugs for Remedies," gives a very sad and graphic description of the helplessness of the average doctor in the presence of disease. He says: "Where is the young doctor who does not believe in the magic of drugs, and the old doctor, if he is a wise man, who does not look upon the most of them as mischievous, and the minority as deserving of restriction? The pathologist is skeptical of them all. Do we waiting behind the eye of Koch know anything of tuberculosis or believe that he does? Does not the ravage go on? And who has won eminence in our yellow fever? Are men no longer in dread of the cholera? Who ousa rheumatism or chronic Bright's disease? And where is the stout heart that never failed before the patient burning and broiling in the horrible slow flame of pyæmia?" Stille and Mairorb's dispensatory gives a list of 150 remedies for rheumatism, from grandma's teas and fomentations to the latest specialist with 40 grains of salicylic acid to the dose. And what is true of rheumatism is largely true of all other diseases. There are many drugs but few remedies.

That medicine is not an exact science, nor likely soon to be, is evident from the great uncertainty of diagnosis. There are very few diseases whose signs and symptoms are so constant that no mistakes can be made, and no fact is more notorious than the almost daily difference of opinion among doctors.

Of course the first thing to decide on entering the sickroom is, what is the matter. To fail here is to fail in practice, and hence the ability to diagnose is the surest test of real medical genius. Most any one may prescribe when it is known what is the trouble, and the ability to diagnose is by no means an acquired talent, for in that case the doctors would all be nearly of equal merit. They all read and study the same books. They are generally well posted in anatomy and physiology. They all look at the tongue, explore the pulse, go through the process of auscultation and percussion. But in opinion and practice it is well known they often go widely of the mark. However valuable the schools may be, the fine insight, the acute, delicate and quick perception that characterizes the superior physician, is something that cannot be found in the books or transmitted through a diploma.

We suspect, however, that one cause of so many mistakes in the treatment of disease comes from the fact that the physician is too hasty in making up his mind. Here the patient is usually largely to blame. He expects the doctor will be able to tell him what is the matter on the first visit, and the doctor is afraid to frankly state his doubt and take time more thoroughly to study the case. The patient may grow alarmed and send for some one else. But were all physicians equally careful and cautious, their patients would soon learn not to expect the doctor to jump to a conclusion at the first visit.

But passing all this by, we can hardly agree with most doctors in regard to prognosis. While quite free in making a diagnosis, they are usually very reticent on prognosis. Now the knowledge of an incurable disease does not aggravate the malady nor hasten its progress, and surely one who is approaching his end has an indefeasible right to know it. The matter may require prudence and wise caution, but we have seen so much horror thrown around the deathbed by delusive hopes that we cannot regard such a course as anything less than inexcusable sympathy, if not absolute cruelty.

CIGARETTE SMOKING.—So serious a detriment to health has cigarette-smoking become in Frankfurt, the capital of Kœnigreich, that the Governor made special reference to it in his late message, and the city authorities have followed up the matter by passing an ordinance forbidding the sale of cigarettes in that city.

The Martin White Suit Ended.

After many years of long and wearisome litigation, the celebrated Martin White mining case was dismissed in Judge Lawler's court last week.

The suit had its birth in the old Nineteenth District Court, and the bundle of dusty records tied up with a string is all that is left of this famous suit.

Like "Jarndyce vs. Jarndyce," told of in Dickens' celebrated *Bleak House*, many of those who had an interest in its final result have long since become dust.

The suit was brought by Martin White against Annis Merrill, John A. Hooper, F. B. Hooper, E. D. Sawyer and Geo. C. Hickok. The Martin White Mining Co.'s mines were located at Ward, in Nevada, and the capital stock of the company comprised 100,000 shares, of which, on the 28th day of April, 1877, White claimed to own 58,625. His suit was brought against these men as shareholders to recover

the current year, with an encouraging probability that a return to 50-cent dividends will be recorded before its expiration. The payment of this last dividend aggregates a total of \$3,358,300 disbursed to shareholders during the past three years out of the ore discovery made in 1886, and a total of above \$80,000,000 disbursed from bullion realized from ore extracted from the ground included in the Cons. Cal. and Va. boundaries since the discovery of the first bonanza in 1874.

CALIFORNIA'S WEALTH OF GOLD.—"The gold in your soil is not by one-tenth exhausted," said an English mining expert to a reporter in the Palace hotel. "Your mining industry is as yet in its infancy, and half that you produce you let go to loss. Now, I have just made an inspection of certain mines in behalf of an Eastern company, the locality of which I will not tell you, as I am not advertising any section of this State, nor any particular mines, and my journey carried me pretty well all over the mining counties of the State, both north

In a Flower Garden.

Our engraving presents a photographical view in a well kept Kern county garden located on Greenfields Ranch, as the property is appropriately called. The situation is about ten miles south of Bakersfield, and the ranch is one of the several belonging to Haggin & Carr, and the view represents a part of the ornamental horticulture which surrounds the superintendent's cottage. In the foreground, the large circular bed is planted with geraniums and pink arranged around the fan palm in the center. To the right is a large locust tree, up the trunk of which a Cherokee rose has grown, reaching nearly to the top of the tree, forming, when in bloom, an immense bouquet nearly the size of the tree itself. Upon the left is an end view of the cottage, with its veranda opening into a long grape arbor which extends to the building, the roof of which is seen in the distance. Upon the veranda is Bevis, the faithful

COMSTOCK TOTAL BULLION YIELD.—A correspondent is informed that in estimating the total bullion yield of the Comstock lode from its discovery to date at \$500,000,000, the estimate includes bullion realized from the working of ore tailings. The estimate also includes the bullion realized from ore extracted from mines operated on individual account, of which no record of the exact amount is obtainable. Following is a statement of the bullion yield of some of the principal mines on the Comstock lode: Ophir, \$20,000,000; Savage, \$16,500,000; Hale and Norcross, \$13,500,000; Chollar and Potosi, \$21,000,000; Gould and Curry, \$15,500,000; Yellow Jacket, \$16,500,000; Crown Point, \$24,000,000; Belcher, \$30,000,000; Overman, \$4,500,000; Imperial, \$2,750,000; Kentuck, \$11,500,000; Con. Cal. and Virginia, \$123,000,000.—*Virginia Chronicle*.

PROGRESS OF THE IRRIGATION SURVEY.—The report of the Irrigation Survey for the month of November, lately received by the Secretary of the Interior, states that field-work was car-



GARDEN SCENE ON GREENFIELDS RANCH, NEAR BAKERSFIELD, KERN COUNTY.

\$68,000 and over for money he had advanced the mine from time to time.

Then the causes of the trouble go on through a thousand pages of legal oap, in which White attempted to show that the mine was in debt, and that was the reason why he advanced the money. When asked why he did not allow an assessment to be levied to defray these expenses, he replied that when he asked his friends to hny into the mine, he represented that it was so rich that there would never be any need of an assessment, and after telling them that, said White, "I had rather be at a personal loss than that they should be punished with assessments."

Why the suit was dismissed does not appear, nor does Judge Messick, who has grown gray in the long weary years of its trial, care to tell.

CONS. CALIFORNIA AND VIRGINIA.—The January dividend of \$54,000 by the Cons. Cal. and Va. mine is the 32d dividend declared by the company since its incorporation under the present title in January, 1886. The first was 30 cents per share, the following 30, 50 cents per share, and the present is the first of 25 cents a share. The prospect is favorable that monthly dividends of 25 cents per share will be declared by the company throughout

and south; and I will freely state to you that my reports were of a favorable character. Why, there are thousands of dollars of Eastern and English capital waiting for an opportunity to find investment in California, which has been scared off by the land boom, but which could be induced to come into your mines if you would only show some enterprise yourselves. But I must say that some of your means of working out gold belong to an antediluvian period, and your miners are frequently in the habit of allowing their sulphurets to run to loss instead of saving them. Now, with the introduction of new machinery and the use of an improved style of mining, I predict that your mines will produce as much, if not more, than your grain-fields and orchards. Your mines are not by any means exhausted and are to-day, in my opinion, the best property any one could invest in."

The Federal Land Office at Sacramento has decided in favor of the claim of John B. Hobson to Iowa hill. This needs confirmation by the General Land Office.

The Automatic Can Machine Co. has sued the Pacific Can Co. for infringement of patent on a machine for plating and soldering heads in cans.

ful watch-dog of the ranch, and just beyond his figure is the trunk of the weeping willow whose graceful branches are seen above the grape arbor. This willow is but 12 years old and has a trunk six feet in circumference. The picture is quite suggestive of the quiet and warmth of the California valley in summer-time—a good place for a day dream, or, as its products show, a good place also for industry, as the heart of man is inclined.

ANTI-TRUST BILL.—On the 14th inst. the Senate Committee on Finance considered Sherman's bill to declare trusts unlawful. After adopting several amendments, which do not affect the principle or scope of the measure, the committee ordered a favorable report to be made to the Senate.

The State Board of Prison Commissioners have decided to establish the new Preston Home of Industry on land purchased from the Lone Coal and Iron Co., half a mile north of Lone, Amador county.

NOTWITHSTANDING the comparative inactivity of the Richmond and Eureka Con. Companies, says the *Sentinel*, the prospects of the camp are brighter than could have been expected a year ago.

ried on in California, Nevada, Colorado and Idaho. In the California and Nevada section parties have finished the work assigned to them. The topography of 250 square miles of Pyramid Peak sheet area in California and the Reno sheet area in Nevada was completed. The report of the Hydrologic division was pursued only in California and the Rio Grande valley, New Mexico. In California, examinations were made of a segregation of irrigable lands in the valley of Owen's river. The Hydrographic party inaugurated some experiments in California for gauging rivers by means of an apparatus worked from shore. A camp is being located on Tuolumne river.

HAND-PAINTED TEXTILES promise to be very popular this year in holiday goods. The latest improvement in this class of decorative work is a process by which the colors are laid on with a pen in place of the heretofore inevitable brush. Very delicate shading is produced by the new method.

It is estimated that Philadelphia in fighting the "grip" consumed 2,000,000 quinine pills, weighing about a ton, in ten days. If other cities swallow quinine at the same rate, a scarcity of the drug is more imminent than an ice famine.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

[Owing to the prevailing snow-blockade on the railroads, we are this week without our usual exchanges from Nevada, Utah, Idaho, Mootana, Oregon, Washington and portions of California, which will account for the absence of current mining news from those places.—EDS. PRESS.]

CALIFORNIA.

Amador.

SOUTH SPRING HILL.—*Ledger*, Jan. 18: It is pleasing to be able to report that this mine—unquestionably the best bullion-producer in the county to-day—is looking better than ever. Judging from all appearances it has a long career of prosperity before it. The ore body is large and of excellent grade, and the property is ably managed by John R. Tregloan, the superintendent, to whose judgment the development of this grand mine is mainly due.

MISCELLANEOUS.—R. M. Ford was in Jackson the latter part of last week, delivering stock of the North Gover Improvement Co. to the subscribers, and collecting the two cents per share on the same. A carload of concentrator machinery arrived at the depot Wednesday, consigned to the Amador gold mine, at Jackson. There is now about 40 tons of machinery at the depot for this mine. The ten stamps of the Sutter Creek mill are now running steadily, the usual amount of ore being milled daily. The company will open their main tunnel as soon as supplies can be hauled in.

SUTTER CREEK.—The mines are now running along quite smoothly on account of the excellent condition in which the Amador canal is kept. The Lincoln mine has met with an interruption on account of losing the vein. They will run a crosscut, and expect to strike the ledge again in a few days.

Calaveras.

WAITING TRANSPORTATION.—*Calaveras Prospect*, Jan. 18: We hear that 500 tons of mining supplies and 30 tons of coke for Copperopolis are now at the Milton warehouse awaiting transportation to the mines.

SHEEP RANCH MINE.—Two large wire cables for the Sheep Ranch mine were brought into town on Saturday evening last by teamsters Javeaux and Bryan. The cables weighed 200 pounds each, and were both put upon the reels at the mine on Sunday, the 12th inst. The water having been sufficiently reduced, operations were resumed with a full force of men on Monday. The animated puff of steam and the renewed rumble of the stamps at the mill are cheering sounds to all. Our people had begun to predict a long and dull season of inactivity for our village.

THE UTICA MINE.—*Mountain Echo*, Jan. 16: Work is being prosecuted in the stopes running north and the mill is kept in operation crushing ore taken from that part of the mine. The work to recover the bodies of the dead miners is progressing in the south end, but owing to the broken up and dangerous condition of the ground progress is that direction is necessarily slow. Nothing new has been developed during the past week and the dead miners still slumber in the position in which the death-dealing cave has laid them. As we stated several weeks ago, it will be many weeks and perhaps months before any of the bodies can be recovered. Nevertheless the public and the friends of the dead have the consolation of knowing that the company is doing its whole duty in the matter.

El Dorado.

GULCH CLAIMS.—*Placerville Observer*, Jan. 21: Everything is still quiet among the various claims in the county, save in one or two of the large, well-developed mines. The cold, stormy weather, with a heavy snowfall, has stopped all outside work of every description, and but little work can be done in the developed claims that are not well housed in. All mining ditches are frozen up at their heads, and water is scarce. It was hoped by all miners that the big storm had ended, and that warm, thawing weather would follow, giving plenty of water for milling and gulch work. There are a great many good gulch claims yet left in the county, remote from water-courses, which can be worked only in a season of abundant rainfall, such as the one upon us this year. Every ravine or swag where a head of water could be obtained had its busy miner some time back, and the prospects were for a large aggregate clean-up from this source throughout the county; but freezing weather came suddenly, and has lasted well, with the result that the water is checked and gulch claims are idle awaiting a thaw, which now appears to be remote.

EL DORADO.—The most important news of the week among the mines is from the old Church mine, now known as the El Dorado, situated in El Dorado mining district, adjoining the famous Springfield mine from which Hayward, Hobart and Poundstone have realized such a fine fortune in years gone by. The El Dorado mine was purchased a couple of years ago from G. G. Blanchard of this city, by Ex-Governor Perkins, Jacob Neff, W. H. Brown and others, who believed they secured a fine property. The mine had lain idle for a number of years with but little development work done on it. The new owners began prospecting it in a systematic manner, employing as their superintendent one of the best practical miners on the coast, Mr. Richards, formerly with the Hotelling Iron Co. at their mines in Placer county. They began a new shaft, striking good ore at once, soon erected a mill, crushing a large amount of rich rock. About a year ago, having prospected to their satisfaction, the company determined to put in a thorough system of works, at the same time putting the mine in the best shape possible for working. They have accomplished during the past summer and now have works not excelled by any mine in the county. Their new double-compartment shaft is a model in every particular and adapted to the expeditious handling of a tremendous amount of ore. The shaft is now down about 550 feet with about 50 feet more to go on the present contract, the job of sinking having been let in contracts of 200 feet each. The shaft was started considerably east of the lode, which dips east, and it was expected to cut the lode at a good depth and then test its worth as compared with the surface

rock. During the past week at a depth of a little over 550 feet the contractors struck the vein, which was found to be seven feet through of fine rock, free-milling and rich. This magnificent ore body of rich material is a bonanza for its owners, and shows almost conclusively that the El Dorado is one of the richest mines in the State. It has heretofore had the name of being one of the finest properties in the county, and has done for its owners what no other mine in the county has done, and what can be said to be true of few mines in California—namely, it has paid its way from the start and paid handsome dividends besides.

VARIOUS CLAIMS.—The news from the El Dorado this week is not only good news for its owners, but for every mining man in the county. For several years past El Dorado county has been looked at suspiciously by men of capital inclined to invest in mines, from the fact that a great many men had taken hold of claims only to give them up after putting considerable money into them. This was looked upon as a suspicious circumstance, and the failures were of course attributed to the fact that the mineral was not here, rather than to any failure of management or a proper development of the claims taken hold of. The few claims that have been well developed in the county show conclusively that the mineral is here and stays with depth. There are the Montezuma at Nashville, the McNulty, El Dorado and Springfield at El Dorado, the Mount Pleasant at Grizzly Flat, the Kelsey at Kelsey, the St. Lawrence at Louisville, the Taylor at Garden Valley, and others, all mines that have paid handsomely and have been well developed. All but the Mount Pleasant at Grizzly Flat are on the well-defined Mother Lode belt, showing that pay rock is to be found along the entire belt, from the famous Keystone in Amador to the rich and unfailing mines in Nevada county. Most of these claims have been taken hold of by numerous individuals and companies and as often abandoned as worthless, like many other claims in the county; but it is a noteworthy fact that such of these claims as have been taken hold of by men of experience, with thorough and competent men to manage them, have proven to be immensely rich with depth and have paid large fortunes into the pockets of the undaunted owners. The developments in the El Dorado have added point to these remarks, for the El Dorado is a mine that has passed through varied experiences, was generally considered of no account and was bought by the present owners for a mere trifle. Yet by judicious management the hidden wealth has been unearthed and dividends have been paid while prospecting the claim and erecting buildings and machinery, and the mine placed in the front rank of the rich mines of the county.

Nevada.

THE "TIE-UP."—*Fidings*, Jan. 14: The situation at the mines is unchanged, but the "tie-up" will not be of long duration. At the Idaho only the pump is in operation, by water-power; steam is running the Empire pump, and water the North Star pump. The mills and miners are idle, save that at the North Star the machine drill operators and contractors are at work. Steam is operating the Hartley machinery, but the mill remains idle. Water from Wolf creek is being utilized at the Omaha, and it is expected to start up the mill this evening with power from the same source.

OMAHA MINE.—*Grass Valley Union*, Jan. 21: The Omaha mine has not been interrupted in its operations and its eighteen stamps have been pounding away through the whole of the storm siege, while all the other stamps of the district are idle. The company fell back on its former plan of taking water from Wolf creek to run the big Pelton wheel and has thus been able to continue with but brief interruption.

FILLED UP WITH SNOW.—*Grass Valley Union*, Jan. 19: No news from the South Yuba Canal, as to its condition, but it is supposed to be filled up with snow, which may have to be shoveled out before water-power can be furnished to the mines of this district. The miners have before them an indefinite season of idleness.

Placer.

TOO LATE.—*Placer Herald*, Jan. 18: According to W. Hill, Grant Van Vactor was a month too late in starting to put up his machinery at Canada Hill. He succeeded in getting his cabin built, but the timbers and lumber for the mill and the machinery are lying under 25 feet of snow. The mortar was set and the gallow-frame was up before the storm began.

CHANNEL.—John Schipman has a valuable claim on New York Canyon and estimates that he will have to run his tunnel only 75 feet further to tap the channel.

San Diego.

A DANDY PROSPECT.—*Julian Sentinel*, Jan. 17: The new 20-stamp mill at the Stonewall mine is expected to be put in operation by the first of next month. It will be a dandy mill, on a dandy mine, and we suspect it would take a dandy pile of cash to buy it. There are other dandy mines in these mountains, too, the Ready Relief for instance, but then, it is not owned by a governor.

Santa Barbara.

BEACH MINING.—*Lompoc Record*, Jan. 12: There are now at work in the beach mines five companies, all doing well. There is nothing fabulous in these mines, but it is demonstrated that it pays to work them. There seems to be no exhausting a claim. With each recurring tide the mines are surcharged with gold so that practically the mines are inexhaustible. For months the same ground has been mined over, week after week. The opinion prevails among the miners that this fine gold is carried along in the Japan currents which are known to touch the coast above Point Conception at the point where these mines are the best. It has been suggested that by the use of a dredging machine gold in much larger quantities might be secured.

Sierra.

GRAVEL.—*Mountain Messenger*, Jan. 11: The Wide Awake Mining Co. has struck gravel in its new main tunnel, and expects to take out pay-dirt by next spring. The company has, in our opinion, one of the best gravel claims in this county.

Shasta.

CLOSED DOWN.—*Courier*, Jan. 18: Wm. T. St. Auburn, Supt. of the Niagara mine, French Gulch, was here Thursday, and went on up to French Gulch to close down the entire works on account of

the weather, and until a more favorable season of the year.

MORE STAMPS.—*Redding Free Press*, Jan. 16: The Gladstone M. Co., French Gulch, will add immediately ten stamps to their 12-stamp Paul battery, making 22 stamps, and a capacity of 45 tons every 24 hours.

Tuolumne.

TOO HARD.—*Independent*, Jan. 18: The men who took the contract of sinking the Bonanza shaft at \$14 per foot have quit, as they could not make it pay, owing to hard ground. The company have now taken hold of the work themselves, and are operating Burleigh drills.

EUREKA.—*Sonoma Democrat*, Jan. 18: The Eureka mine at Summerville is being reopened and further developed after many years' cessation of work. Hayward & Hobart are the owners of this property, and it is a valuable one. It is situated north of the Dead Horse.

NEVADA.

Washoe District.

HALE AND NORCROSS.—*Virginia Chronicle*, Jan. 14: A body of ore, in some places two timber sets (12 feet) in width, is developed on the 1200 level in the Hale and Norcross mine. Car samples of this ore show an average value of \$35 per ton. This ore is the upward continuation of that developed nearly three years ago on the 1300 level. At that time a winze was sunk on the ore, but it proved too narrow to extract and convert into bullion profitably. The streak was followed north and south with lateral drifts, and a raise driven into it above the south lateral drift showed no improvement in width. A north raise was recently made in the ore above the 1300 level, following the strike of the vein, which led to the development mentioned above. The fact that it has steadily widened as it was followed upward, indicates that a much greater breadth will be found in raising on the vein to the 1000 level.

OPHIR.—*By Telegraph*, Jan. 18: On the 1300-foot level, from the end of the east crosscut on the shaft station, a south drift is advanced 225 feet from the end of the east crosscut, 316 feet from the shaft station, continuing in porphyry, mixed with quartz, showing value.

CON. CAL AND VA.—From the stopes on the 1300, 1435, 1500, 1600 and 1650-foot levels the ore yield during the past week has been almost entirely suspended on account of the ore side tracks being blocked with snow. The men employed on the ore stopes are temporarily laid off for the same reason.

SAVAGE.—Explorations are progressing as usual on the 400, 560 and 600 levels. Ore shipments are temporarily suspended.

HALE AND NORCROSS.—We shipped to the Nevada mint during the week 537 tons of ore. The falling off is due to the snow blockade of the ore-house side track.

CHOLLAR.—We crushed 210 tons of ore during the week, showing a pulp assay value of \$25.50 per ton.

BELCHER.—The 850-foot level east crosscut is in porphyry, showing streaks of quartz. The 200-foot level east crosscut is still in low-grade quartz.

SEG. BELCHER.—Ore buoches are still showing in the 1200-foot level drift from the winze.

IMPERIAL.—West crosscut No. 1, on the 500-foot level joint Confidence-Challenge drift, is still in quartz and porphyry. West crosscut No. 2, on the 300-foot level, continues to show bunches of ore.

OVERMAN.—We have opened the 1200-foot level preparatory to stripping ore near the Seg. Belcher mine.

ARIZONA.

TOMBSTONE DISTRICT.—*Prospector*, Jan. 16: There is a satisfaction in knowing that a crisis is approaching in Tombstone's history—that longed-for period when something will have to be done toward pumping out the water, or a virtual abandonment of the mines that are the big producers of the camp. There is no disguising this fact even on the part of the owners themselves. The Coontention folks are putting up \$20,000 per year to keep their works and mine in shape. This has been a matter-of-fact during the three past years, and that company has expressed a flat-footed flat that they will not continue to pay out money any more without some resulting benefits. The Grand Central Co. are feeling in the same mood as regards their properties, which will soon be in shape to hang up unless a deep working proposition is made and accepted. In Tombstone district and vicinity very little has been done of importance. The Comet is shipping 600 ore at present, but sinking is progressing rapidly. The Herschell is producing good ore in the north end. Ritter struck a very rich pocket during the week in the Sunset. Some of the ore that he brought in is half metal. A contract was about to be closed with the Sterling mill for the working of 3000 tons of ore from Turquoise district. It is understood now, however, that the deal was not consummated.

MOHAVE CO.—MINER. Jan. 18: The lessees of the Rural mine have made another strike of good ore. J. P. Finegan, is working a force of men on a claim below the Itasca and is taking out some fine ore. Garcia & Jimenez have about 18 inches of fine ore on their gold claim near the Connor mine. P. H. Leddy struck a fine-looking prospect last Sunday near Mineral Park, which shows wire gold in the croppings. T. A. Murphy is working a claim near the Tuckyho which shows up an ore-bearing streak 8 inches wide, which assays 10 ounces in gold and 12 in silver. Henry P. Ewing has on the dump of the Tuckyho mine about eight tons of high-grade ore. The Esmeralda mine, near Cerbat, at the depth of 115 feet shows up a three-foot ore body, which assays 70 ounces in silver and 20 ounces in gold per ton. The Rattan mine has been closed down temporarily, awaiting the erection of a mill for the treatment of their ores. The company expect to have the mill ready for operation by May. In Gold basin operations will be commenced at an early day by the O. K. mining company. Water pipe sufficient has been purchased to lay six miles of pipe line. A mill will be put up, and it is expected that the mines and mill will be in operation by the first of May. An additional flow of water was struck at Patterson's well recently which insures plenty of water.

MINERAL PARK.—A gentleman from Mineral Park gives us the following notes in regard to ore

now on the dumps and awaiting shipment at the various mines in that place and Chloride: Coon & Son on the Sabbath Bell have a fine lot of ore for shipment. Erin Sherman has about 20 tons of ore ready for shipment from the Raibow. The Queen Bee, Park & Henson, have 100 sacks of ore on the dump awaiting the big team. Durden & Frolich have a lot of ore from their new claim in Chloride ready and expect to ship a carload. McKinnon & Kostar have a carload of ore on the Atalla dump ready for the teams. This ore carries a large percentage of copper. E. F. Thompson has about 30 tons of ore on the Empire dump, awaiting shipment. This is high-grade ore and will net a handsome sum.

BRITISH COLUMBIA.

ALLUVIAL DIGGINGS.—*Victoria Colonist*, Jan. 11: Prospectors in the Chilcoten country, about 150 miles direct east from Soda creek, have discovered alluvial diggings which give promise of turning out well. Three creeks were prospected, and from each excellent prospects of gold were secured, although the ground has not as yet been properly opened up. The men who have visited the region are confident that they have a rich find. The creeks are on the western slope of the coast mountains, and empty their waters into Bute inlet.

DAKOTA.

SYNDICATE SMELTER.—*Deadwood Pioneer*, Jan. 11: Syndicate smelter blew in yesterday for a two-weeks' run on ore from the Ross-Haoohal, Isadorah, Double Standard and Toronto. Until the run is completed results will not be known, and they will not even then if the same secrecy is preserved that has marked the policy of those having the experimental plant in charge to the present time.

AN IMPORTANT DEAL.—Some months ago mention was made of the fact that Patrick Killoreo and Stephen J. Breyer had struck a body of very excellent silver ore on certain locations they made on Jim creek. Several claims were located and they are now known as the Calihogo group. Killoreo and Breyer at once went to work developing the property; work met excellent results, what was apparently barren ground only a little while before began developing into mines of more than common value. Certain Lead City parties learned the facts and became interested. Among them was Ernest May, who through Judge Rhinehart negotiated a 90-days' bond on the property for a good round sum, of which \$1500 cash was paid at the time. The bond is just about expiring, and Breyer, one of the owners of the claims, in town last night, stated to a *Pioneer* reporter he had no doubt conditions of the bond will be fulfilled within a day or two and the property purchased. The Calihogo ore carries a large percentage of lead, an element hitherto scarce in the Hills, and until the pyritic process was found applicable, essential to smelting our ores. When the sale is consummated it is believed parties purchasing will at once begin working the mines on an extensive scale, put up a large plant and regularly turn out bullion.

FLOAT.—Considerable interest is felt in the test run being made on the Glendale tin mine near the Etta, by one of Gates machines. If it is successful, one or more will be ordered for Nigger Hill mines. The machines only cost \$2500 on hoard cars at Chicago, and it is hoped that it will be a success.

LOWER CALIFORNIA.

ALAMO.—*Lower Californian*, Jan. 12: Business at Alamo has been quieter than usual for a week or two past, owing in a great measure to the heavy rains which have fallen in that district, effectually putting a damper on any progress being made in the various mines. Twenty-eight inches of rain is said to have fallen, and it will do good in disclosing various placer diggings which exist in that locality. The Lane mill is the only one in operation at present. This mill crushed 10½ tons of ore from the Asbestos mine the latter part of last month, which yielded \$525. This is a high average and sustains the good reputation of the Asbestos. Feliciano Aldrete has bought a half-interest in the Todos Santos mine, southwest of the Tarantula. It is pronounced a rich mine. Fifty-four tons of Aurora ore run \$40 per ton in Lane's mill a few days ago. Judge Kerr has sold his half-interest in Lane's mill to J. M. Gonzalez, and the Judge intends to put up a Wiswell mill of his own in camp. Major Geo. B. Zimleman, of the El Paso M. M. Co., went out to Alamo Tuesday, accompanied by Mr. Charles Dobler, an experienced miner, who will hereafter superintend the El Paso Co.'s several mines and mill. Major Zimleman states their mill will soon commence on 500 or 600 tons of ore now on the dump from the Avalina and El Paso mines, and that they intend to push their work. Judge A. J. Reeves, of the Liberty Mining Co., whose mill is located at Santa Clara, in Mexican Gulch, has been in town nearly a month waiting for the roads to become passable in order to bring lumber from Tabeta to inclose their mill and make other improvements. The heavy roads and rainy weather have prevented them from doing any work whatever. The International Co. has let contracts for sinking shafts 4 by 8 feet, and 50 feet deep from the surface, to be well timbered, on the Grande and Penelope mines; and also for a shaft 50 feet deep from the surface and 4 by 5 feet in size, to be well timbered, on the Spider mine.

NEW MEXICO.

THE ECLIPSE.—*Kingston Shaft*, Jan. 11: Development upon this mine is being pushed ahead by Sup't Rencher. Four men are employed.

THE GRAY HORSE.—The ore bodies on this mine show up as good as ever. The vein is being stripped, and systematic explorations inaugurated.

THE ILLINOIS.—This "Old Reliable" retains a full force of men, and continues to produce regularly. It is presumed that the Illinois now has a continuous pay streak of ore for a distance of over 300 feet.

THE U. S.—This property continues development by driving the main tunnel. From the winze, ore is constantly being taken out, and the ore body holds its own.

THE BRUSH HEAP.—This famous producer continues to open out new ore bodies. It is reported

that it now has a larger and richer body of ore in sight than ever.

THE GYPSY.—This mine continues to produce steadily. An upraise is now being made on the ore body, and a winze is also being sunk, which is showing ore in fair quantities. It is reported that by the first of the next month, several prominent mines will resume active operations.

HILLSBORO DISTRICT.—Morris Lundy and Thomas Long, owners of the Helen mine, began work on this property last Tuesday.

BONANZA.—The Pioneer mill is running day and night upon ore from the Bonanza mine. This week they will finish up a 400-ton run, and then stop to clean up. The mine is in splendid condition, and the stopes full of ore.

EL ORO.—This property is being worked steadily under the management of Mr. Richard Troeger. The new main working shaft is now down 100 feet, and is thoroughly timbered. Ore-houses, boarding-houses, bunk-houses and a fine shaft-house, are now partially completed, over 50,000 feet of lumber being used in their construction. It is the intention of the company to sink this shaft 500 feet before stopping.

THE MAMIE RICHMOND.—This mine is working regularly under the lease system, as well as by the company, and the present workings are all in ore. The first of the week, a carload was shipped to Denver, from which the returns have been received, which ran \$157 per ton, gold and silver.

CALEDONIA AND HIBERNIA.—These properties lie northeast of Warm Springs, and are showing up very well. The former shows a paystreak of six inches of gold ore. Mr. John Donahoe recently purchased a one-third interest in the Caledonia and a one-fourth interest in the Hibernia. W. S. Hopewell also purchased an equal interest in each of these mines, John Ryan retaining the remainder of the interests. They recently made a test mill-run of five tons of ore, which gave a return of \$65.50 per ton in gold, which was highly satisfactory to the owners.

THE GOLDEN ERA.—The main shaft on this mine is down 100 feet, and levels run at 50 feet, which show from three to four feet of ore similar in character to the ores of the Mamie Richmond mine, assaying well in gold and silver.

MARKET REPORTS.

Local Markets.

SAN FRANCISCO, Jan. 23, 1890.

The almost impassable condition of interior roads, together with snow blockades on two leading railroads, and several feeders, has interrupted general trade to such an extent as to make our principal business streets wear more a holiday appearance than at any time this year. Although few, if any, merchants enjoy enough business to cover current expenses, yet each and all are very hopeful of the future and look forward to a more prosperous year than enjoyed for a decade. Remittances are still slow, but money does not appear to be close except in exceptional instances. The banks appear to be well supplied with funds and doubtless meet all legitimate requirements of regular customers.

The steamer City of Peking, hence January 22d for China, etc., carried the following shipments of treasure:

TO HONO KONO.

Chinese, Mexican dollars.....	\$24,082 00
Chinese, gold coin.....	1,075 00
Anglo-California Bank, Mexican dollars.....	230,000 00
Hong Kong and Shanghai Bank, Mexican dollars.....	181,000 00
Total.....	\$437,057 00

MEXICAN DOLLARS.—The market has ruled quiet throughout the week, with toward the close quite a shading in prices, being quoted yesterday at 75½¢ @ 76 cents, and to take at the same range.

SILVER.—The principal buyer has been the United States Mint. The price paid was advanced, in sympathy with higher prices at the East and abroad, to 97½ cents, but on Monday lower prices were paid, and again on Tuesday, with a still further decline on Wednesday, the price being yesterday (Wednesday) 96½ cents. The available supply is still light, due largely to snow blockades. The recent advance abroad was owing to free purchases by India and not to the Bank of England. The latter institution, it is stated by those in position to know, has not bought silver bullion, but the English Government did, which was, at the time, noted and commented on by this paper; but the Government has not bought any bullion within the past five or six weeks. The proposition to allow the bank to carry one-third of its reserve in silver has always been allowable, made so by an Act of Parliament years ago, but has not been taken advantage of. The issuing of £1 notes against silver is a good proposition and will undoubtedly be done. In both Ireland and Scotland £1 notes are in general use and found to meet with favor. The Chancellor of Exchequer is at work on some kind of general plan to give relief to the English money market by still further introduction of silver coin.

In the local market export buyers are not, to any great extent, in the market, which gives color to a report that grain bills meet all or about all the demand for exchange purposes. After next month wheat shipments will be slower, and therefore fewer grain bills will be offering.

This (Thursday) morning there is no telegraphic communication, owing to the lines being down, so that no silver quotations, at this writing, are obtainable. Exporters are bidding below New York prices. This, they say, is due to no China business. When the Chinese business toward the close of spring sets in, then prices will be apt to again rule above New York. The last purchase report by the Mint in this city was at 97½¢ on last Tuesday. In the absence of telegrams, the Mint was not bidding this morning, or at least they so state.

Since putting the above in type, Eastern telegraphic communication is resumed, giving silver quotations in London at 44s 9-16d, and New York at 97 cents.

QUICKSILVER.—Receipts the past week aggregate 528 flasks. The home demand is quiet, owing to impassable roads in principal mining districts.

TIN.—Imports the past week aggregate 1345 ingots from Australia. Both pig and plate on spot continue to favor buyers, but owing to high prices

abroad no business can be executed. Canniers here appear to be well supplied for immediate wants. Some have started up for salmon packing.

BORAX.—Receipts the past week aggregate 264 cts. The market continues steady at firm prices.

LIME.—Receipts the past week aggregate 2184 bbls and the exports 350 bbls to the Hawaiian Islands. The demand continues slow, owing to bad weather.

CHROME ORE.—There was shipped the past week 115,780 lbs. to New York. Quotations remain unchanged.

COPPER.—There was exported the past week 20,100 lbs. copper cement to New York. In refined copper there is nothing new to report, owing to continued bad and impassable roads having cut off, temporarily, all reliable sources of information.

COAL.—Imports the past week were as follows: Newcastle, N. S. W., 6614 tons; Baltimore (Cumberland), 5917; Nanaimo, 152; Departure Bay, 800; Tacoma, 2000. Total, 18,483 tons. Greta and Cumberland are lower for spot, but for shipment they are firm. It now looks as if there will be a scarcity of Australian after the next 60 days. The tonnage on the way from Australian ports and on berth to load is smaller than for years. The worst of it is that new business cannot be executed except at higher prices. Coast colliery coal is without any special features of interest to note. With lessened Australian there will be more demand for coast coals.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, January 23, 1890.

ANTIMONY.....	25 @	32
BORAX, refined, in carload lots.....	7 @	78
" powdered.....	7 @	60
" concentrated.....	6 @	62
All grades jobbing at an advance.		
COPPER.....	21 @	32
Sheet.....	22 @	34
Ingot, jobbing.....	17 @	18
do, wholesale.....	15 @	16
Fire Box Sheets.....	22 @	24
LEAD.....	4 @	41
Sheet.....	4 @	40
Pig.....	7 @	40
Shot, discount 10% on 500 bags Drop, 50 bag.....	1 45 @	60
Buck, 50 bag.....	1 65 @	60
Chilled, do.....	1 85 @	60
STREET—English, D.....	16 @	20
Canton Kool.....	9 @	9
Black Diamond Kool.....	8 @	9
Pick and Hammer.....	8 @	10
Machinery.....	4 @	5
Tin Calk.....	4 @	5
TIN PLATE—E. V. steel grade, 14220, F. S.....	5 50 @	60
E. V. steel grade, 14220, spot.....	4 50 @	5 00
Charcoal, 14220.....	6 75 @	7 00
do, roofing, 14220.....	6 00 @	6 00
do, do, 20x28.....	12 @	22
do, do, to load.....	13 50 @	15 00
ORE—Eng, ton, spot, in blk.....	13 50 @	15 00
QUICKSILVER—By the flask.....	47 @	47 50
Flasks, new.....	35 @	40
Flasks, old.....	35 @	40
CHROME IRON ORE, 50 ton.....	10 @	62
IRON—Bar, base.....	3 @	31
Norway, base.....	4 @	34
IRON—Glenasmole ton.....	35 @	40
Eglington ton.....	35 @	40
American Soft, No. 1, ton.....	35 @	40
Oregon Pig, ton.....	35 @	40
Eucaly Sound.....	35 @	40
Clay Lane White.....	27 @	30
Shots, No. 1.....	35 @	40
Bar Iron (base price) 50 lb.....	34 @	40
Langdon.....	35 @	40
Torncliffe.....	35 @	40
Guthrie.....	35 @	40

Coal.

	TO LOAD.			
	Per Ton.			Per Ton.
Australian ...	7 50	@ 7 75	Lehigh Lump..	16 50@17 00
Liverpool Stm	8 50	@ —	Cumberland hk	16 00@16 50
Seotch Splint.	9 00	@ 9 00	Egg, hard....	15 50@16 00
Cardiff.....	9 50	@10 00		

SPOT FROM YARD.

Wellington.....	8 00	Seattle.....	7 00
Scotch Splint.....	9 00	Cool Bay.....	6 00
Oreta.....	9 00	Cannel.....	12 00
Westminster Blymbo.....	9 00	Egg, hard.....	18 00
Nanaimo.....	9 00	Cumberland, in sacks.....	18 00
Sydney.....	8 00	do, bulk.....	18 00
Gilman.....	7 00		

Eastern Metal Markets.

By Telegraph.

NEW YORK, Jan. 23, 1890.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday.....	97½	\$14 45	\$3 87½	\$20 45	
Friday.....	97½	14 45	3 85	20 50	
Saturday.....	97½	14 45	3 85	20 50	
Monday.....	97½	14 40	3 85	20 55	
Tuesday.....	96½	14 40	3 85	20 55	
Wednesday.....	96½	14 40	3 85	20 50	

NEW YORK, Jan. 22.—Borax is quiet but very firm at unchanged prices. Tin plate is offish, as is pig. Lead has a steadier tone, owing to lessened offerings. Quicksilver is fairly steady. Copper continues strong, with a fairly active consumptive demand reported. European advances still favor the selling interest.

List of U.S. Patents for Pacific Coast Inventors.

The following brief list by telegraph, for Jan. 21, will appear more complete on receipt of mail addresses:

California—Henry Anderson, assignor to R. J. Davis, S. F., pile-covering; Alonzo F. Brown, S. F., stationary spittoon; Wilfred L. Brown, S. F., machine for cleaning fiber; Amasa J. Dewing, S. F., piano stool frame-board; Jas. G. Divall, Oakland, Calif., trancols Frank, Orass Valley, combined saw, pulow and life-preserver; George Grisel, Golden Gate, assignor of two-thirds to F. S. Everlo and J. Case, S. F., machine for wrapping block matches; Lionel Heynemann, S. F., cable-street railway; Henry P. Kelley, S. F., 6th wharf; James Kelley, assignor of half to E. Dougherty, S. F., two patents for transom-litter; Darwin O. Livermore, Los Gatos, sash-fastener; John Parkin, assignor of half to R. P. Frear, S. F., valve gear for fluid rams and pistons; Adolph Sommer, Berkeley, neutralizing sulpho-chlorinated organic compounds.

"NOTICES OF RECENT PATENTS"—The patents which should have arrived from Washington this week are on the delayed mails which are clocked up in the Sierras, so we are unable to publish our usual "Notices of Recent Patents."

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	No. AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Adelaide Copper M Co.....	Nevada.....	1.....	1, Dec 31.....	Jan 31.....	Feb 28.....	W H Graves..... 425 Sansome St
Baltimore M Co.....	Nevada.....	1.....	21, Jan 1.....	Feb 21.....	Mar 12.....	A K Grim..... 402 Montgomery St
Belle Lile M Co.....	Nevada.....	13.....	15, Dec 4.....	Jan 8.....	Jan 30.....	J W Pew..... 310 Pine St
Best & Belcher M Co.....	Nevada.....	13.....	15, Dec 4.....	Jan 8.....	Jan 30.....	J W Pew..... 310 Pine St
Camp Creek M & M Co.....	California.....	1.....	1, Dec 30.....	Jan 19.....	Jan 30.....	S Folger..... 213 Fremont St
Con New York M Co.....	Nevada.....	2.....	15, Dec 11.....	Jan 15.....	Feb 5.....	C E Elliott..... 379 Montgomery St
Con St Gildard M Co.....	California.....	1.....	5, Jan 14.....	Feb 7.....	Mar 10.....	T Wetzel..... 522 Montgomery St
Crocker M Co.....	California.....	6.....	10, Jan 20.....	Mar 5.....	Mar 28.....	T T Messer..... 309 Montgomery St
Excelsior M Co.....	Nevada.....	23.....	25, Dec 16.....	Jan 21.....	Feb 11.....	C E Elliott..... 309 Montgomery St
Giant M Co.....	California.....	1.....	1, Dec 17.....	Jan 23.....	Feb 12.....	H T Briggs..... 309 Montgomery St
Gray Eagle M Co.....	California.....	16.....	4, Jan 21.....	Feb 25.....	Mar 17.....	J M Huntington..... 303 California St
Kentuck M Co.....	Nevada.....	20.....	30, Dec 11.....	Jan 14.....	Feb 4.....	J W Pew..... 310 Pine St
Mayflower Gravel M Co.....	California.....	45.....	50, Dec 27.....	Feb 3.....	Feb 25.....	J Morio..... 378 Montgomery St
Mexican M Co.....	Nevada.....	23.....	25, Dec 21.....	Jan 27.....	Feb 18.....	C E Elliott..... 309 Montgomery St
Mineral King M & M Co.....	Arizona.....	4.....	10, Jan 10.....	Feb 10.....	Mar 3.....	P H Leonard..... 419 California St
North Central G & S M Co.....	Nevada.....	1.....	7, Dec 2.....	Jan 6.....	Jan 27.....	P W H Watson..... 302 Montgomery St
Natoma Water & M Co.....	California.....	2.....	5, Dec 21.....	Jan 28.....	Feb 25.....	P W Ames..... 516 California St
Occidental Co & M Co.....	Nevada.....	5.....	25, Jan 20.....	Feb 25.....	Mar 24.....	A K Durbur..... 309 Montgomery St
Overman & M Co.....	Nevada.....	51.....	25, Dec 31.....	Feb 5.....	Feb 25.....	G D Edwards..... 414 California St
Palladium M Co.....	Nevada.....	2.....	5, Nov 1.....	Dec 25.....	Jan 30.....	D Buck..... 309 Montgomery St
Russell R & M Co.....	California.....	6.....	5, Jan 13.....	Feb 17.....	Mar 12.....	J Morio..... 378 Montgomery St
Sey Belcher & Miller M Co.....	Nevada.....	5.....	25, Jan 20.....	Feb 25.....	Mar 24.....	A K Durbur..... 309 Montgomery St
Silver King M Co.....	Arizona.....	2.....	30, Jan 15.....	Feb 20.....	Mar 27.....	A Waterman..... 309 Montgomery St
Trinity River Tunnel & M Co.....	California.....	2.....	50, Nov 27.....	Jan 6.....	Jan 24.....	L H Pockman..... 28 California St
Tetrahok M Co.....	California.....	3.....	1, Dec 14.....	Jan 21.....	Feb 14.....	J W Garrett..... 308 Pine St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Apollon M Co.....	.....	L Sloss, Jr.....	310 Sansome St.....	Annual.....	Jan 27
Calisto M Co.....	.....	.....	310 Montgomery St.....	Annual.....	Feb 3
Del Monte M Co.....	.....	.....	310 Pine St.....	Annual.....	Jan 21
Lucky Hill Oon M Co.....	.....	F D Black.....	Baldwin Hotel.....	Annual.....	Feb 13
North Commonwealth M Co.....	Nevada.....	J W Pew.....	310 Pine St.....	Annual.....	Jan 23
Rising Sun M Co.....	.....	L Sloss, Jr.....	310 Sansome St.....	Annual.....	Jan 26
Utah Oon M Co.....	.....	H Fish.....	310 Montgomery St.....	Annual.....	Jan 29
Uab Con M Co.....	Nevada.....	A H Fish.....	309 Montgomery St.....	Annual.....	Jan 29

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Champion M Co.....	.....	T Wetzel.....	522 Montgomery St.....	10.....	Jan 20
Caledonia M Co.....	Nevada.....	A S Cheminant.....	328 Montgomery St.....	10.....	Aug 5
Con California & Va M Co.....	Nevada.....	A W Havens.....	309 Montgomery St.....	50.....	Jan 10
Durbee Elus Gravel M Co.....	California.....	T Wetzel.....	522 Montgomery St.....	10.....	Dec 23
Idaho M Co.....	California.....	.....	309 Montgomery St.....	5.....	Nov 7
Mt Diablo M Co.....	Nevada.....	R Heath.....	319 Pine St.....	30.....	Oct 21
Pacific Borax & Soda Co.....	California.....	A H Clough.....	230 Montgomery St.....	1 00.....	Jan 10

Mining Share Market.

La grippe, close money market with the general public, bad roads, snow blockades and other evil (from a stock point of view) influences have made a dull mining share market. If the few chippers went into the market to turn an honest penny by "cinching" the insiders or any other persons, they found it uphill work, for they sold short anyway freely the market was advanced to make them fill, and if they bought heavily, long prices were sent down to make them disgorge. Outsiders now pin their faith to the coming of Col. Mackay, for points are out that there will be nothing much until after he gets here, but how long it will be before he deigns to visit this coast remains to be seen. It now looks as if it will be all of a month, if not longer, owing to snows, etc. It is generally claimed that before the Colonel arrives in this city prices will be lower than at any time this (1890) year. In the outside stocks the Quijotas were lifeless, the Tuscaroras were hanging pending two or more assessments, and lower prices looked for; while the Bodies showed little more activity. Many well-informed on the Bodie stocks have no faith in them until after an assessment is levied on Bodie, which report gives at 50 cents a share.

Snow blockades have cut off all mail communication from the mines, except the Quijotas, whose stocks are listed on the two exchanges in this city. Telegraphic communication, which is at all times unsatisfactory, is still more so now. All ore-extracting in the Comstocks is reported to be suspended owing to heavy deposit of snow. The work now going on in the mines is of a prospecting character. Mining men here are watching with great interest the work going on running from the Ward shaft. If apparently authentic reports can be depended upon, they have made connection from the Ward shaft with about the 800-foot level in Potosi, and now they are pushing the west drift on the 1800-foot Ward shaft to intersect the ore found before they were flooded out on the 2400-foot level. This body of ore is said to be of a very important character, and if found as rich in the 1800-foot west drift as expected, it ought to make quite a stir in the group of mines in the immediate vicinity. Whether the correct information will be given out remains to be seen, for the drift running west has ever since Nov. 2, 1889, been called the east drift, although when started, Pendergast, the superintendent, stated in his official letter that the drift was started west. The prospecting work going on in the other mines is being closely watched. From the Quijota mines nothing new comes to hand. Advances from the Tuscaroras stated that it will take all of two weeks yet before certain important work can be done. From the Bodie no news is obtainable—telegraphic lines down and railroads blocked by snow. From President Ives of the Bodie and Mono mines we learn that it was the intention to have more prospecting work done in Bodie and Mono, that is, follow up by drifts or otherwise every seam of ore which gave promise of running into a body of ore. He says that it was the merest accident (a cave in the mine) that they found the rich pocket of ore from which Bodie paid its last dividends. Whether the company will be as fortunate again remains to be seen, at any rate, it looks as if work will be continued in the mines as long as the public pay assessments, provided no paying quantity of ore is run into.

Bullion Shipments.

Owing to the prevailing snow blockades on the railroad lines, no bullion shipments have been received here for the past week. Wells, Fargo & Co. have refused for several days to receive any more bullion for shipment from the mines in the snow-bound districts. Already various shipments, aggregating \$100,000, lie tied up along the routes in the mountains.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3.00 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Jan. 2.	WEEK ENDING Jan. 9.	WEEK ENDING Jan. 16.	WEEK ENDING Jan. 23.
Alpha.....	1.00 1.15 .95 1.05	.90 1.25 .85 1.05		
Alta.....	1.30 1.45 1.25 1.35	1.20 1.25 1.25 1.30		
Andes.....	.60 .65 .55 .55	.50 .55 .55 .55		
Belcher.....	1.30 2.25 1.65 1.85	1.70 1.85 1.85 1.95		
Best & Belcher.....	2.30 2.85 2.10 2.35	2.25 2.35 2.35 2.40		
Bullion.....	.40 .45 .40 .45	.35 .40 .40 .45		
Bodie Con.....	.30 .45 .40 .45	.45 .50 .50 .60		
Benton.....	.25 .30 .25 .30	.20 .25 .25 .30		
Bulwer.....	.25 .30 .25 .30	.20 .25 .25 .30		
Calisto.....	2.55 3.05 3.05 3.15	3.15 3.30 3.30 3.35		
Con. Va. & Cal.....	.41 .45 .40 .45	4.30 4.60 4.65 4.75		
Challenge.....	1.30 1.55 1.10 1.20	1.10 1.21 1.30 1.35		
Chollar.....	2.35 2.75 2.25 2.45	2.10 2.23 2.30 2.45		
Comstock.....	1.00 1.45 .35 .35	.35 .35 .35 .35		
Con Imperial.....	.30 .35 .30 .35	.30 .35 .30 .35		
Caledonia.....	.25 .30 .25 .30	.25 .30 .25 .30		
Crown Point.....	1.60 2.01 .50 1.75	1.50 1.55 1.50 1.76		
Crocker.....	.25 .30 .30 .25	.30 .25 .20 .25		
Deer Creek.....	.25 .35 .25 .25	.25 .25 .25 .25		
Excubaque.....	.25 .35 .25 .25	.25 .25 .25 .25		
Grand Prize.....	.65 .80 .65 .75	.75 .75 .75 .55		
Gould & Curry.....	1.35 1.65 1.30 1.40	1.40 1.35 1.40 1.35		
Hale & Norcross.....	2.50 2.55 2.50 2.75	2.75 2.70 2.75 2.80		
Jules.....	.30 .25 .30 .25	.30 .25 .30 .25		
Justice.....	1.25 1.01 .20 1.15	1.15 1.30 1.10 1.10		
Kentuck.....	.55 .60 .30 .35	.35 .35 .35 .70		
Lady Wash.....	.35 .35 .35 .35	.35 .35 .35 .35		
Madison.....	.65 .65 .65 .65	.65 .65 .65 .65		
Mexico.....	2.35 2.50 2.15 2.45	2.10 2.45 .35 .35		
Narajo.....	.35 .40 .35 .40	.40 .36 .40 .50		
North Belle Isle.....	1.00 1.10 .05 1.25	1.05 1.25 1.00 .60		
Rev. Queen.....	1.00 .10 .10 1.15	.25 .30 .30 .75		
Union Health.....	1.00 .10 .10 .10	.10 .10 .10 .10		
Ophir.....	3.30 3.90 3.50 3.60	3.50 3.65 3.40 3.45		
Clerman.....	.70 .80 .55 .70	.55 .60 .60 .70		
Petrol.....	1.90 2.01 .65 1.85	1.70 1.75 1.60 1.75		
Peersless.....	.70 .75 .75 .75	.75 .75 .75 .75		
Pico.....	.10 .15 .15 .15	.15 .15 .15 .15		
Savage.....	1.40 1.80 1.40 1.65	1.40 1.55 1.55 1.65		
S. B. & M.....	1.10 1.30 .15 1.20	1.10 1.01 .05 1.21		
Sierra Nevada.....	1.85 2.25 1.75 1.95	1.80 1.90 1.80 2.05		
Sierra Nevada.....	.45 .45 .45 .45	.45 .45 .45 .45		
Scorpion.....	.35 .35 .35 .35	.35 .35 .35 .35		
Union Con.....	2.15 2.60 2.10 2.30	2.05 2.20 2.25 2.35		
Utah.....	.65 .70 .55 .55	.60 .61 .75 .75		
Wadsworth.....	.15 .15 .15 .15	.15 .15 .15 .15		
Yellow Jacket.....	1.95 2.20 1.80 1.95	1.70 1.95 .25 2.05		

MECHANICAL PROGRESS.

American Iron for England.

It may be regarded as a matter of no little moment that a cargo of American pig iron has recently been shipped to England. "It is remarkable," says *London Iron*, "at a time when the home demand for pig iron has attained such magnitude, and when a further impetus is expected in certain quarters by orders from America, to find evidence of an opposite tendency from the latter country. One of the most curious developments of the present active position of the iron trade is that a shipment of metal has already been made from the United States to this country, and more is likely to follow. The Thomas Iron Company has sold 1000 tons of No. 1x foundry pig for delivery in Liverpool. The transaction, it is stated, was a perfectly regular one in the ordinary course of business at the ruling American prices. It is believed in Pittsburgh that more iron will go if prices warrant the shipment. From this position, it is evident that, if the price of pig iron gets much higher, we may expect American competition—quite a new feature in the home iron trade. It would also appear probable on these premises that a check against any further marked advance in the value of pig iron will be found in American competition."

The recent advance in prices will, no doubt, have a tendency to retard to some extent the shipment of iron abroad, and especially to England. Should the present speculative upward tendency die out, the indications are that one might look to an early-growing market in this direction for our surplus product. The United States is now the largest producer of iron of any country in the world, and there is every reason to believe in a continued rapid increase of that product. New discoveries of valuable iron ores and increased outputs are constantly being announced, while in nearly every other country we hear of iron mines giving out, or of their inability to meet the growing demands for their yield. In many localities the yield of our iron mines is limited only by the means for its transportation, but these facilities are rapidly being improved.

Prices of tools, machinery, barbed wire, telegraph and other wires and many other minor articles made of iron, are gradually improving, not only in this country, but throughout the world as well. If under the existing order of things we can make it pay to export the raw material, why should not our abundant and priceless resources of iron be converted into machinery and other articles of necessity by our own mechanics for export, instead of sending abroad the unmanufactured material? More and more are our enormous resources of the baser metals becoming known and appreciated abroad. The United States now stands at the head of the world in the production of both the precious and the baser metals.

CAR-WHEELS OF ROLLED STEEL.—One of the most difficult things in railway maintenance is to secure safe and reliable car-wheels. Various kinds of material and various modes of construction have been tried; but thus far nothing has fully realized what would be considered a wheel which could be accepted as any very near approach to finality in perfection. The latest and perhaps most promising device in this direction is a rolled-steel wheel which has been experimented upon with so good a degree of success, that, according to a Philadelphia exchange, it is thought the new industry which may grow out of it may mark an important development in the manufacture of steel products, and may revolutionize railroad car-wheel construction in this country. The Continental Car-Wheel Co. has procured ground for its buildings in Philadelphia, and will begin the manufacture of rolled street-car wheels. At the present time the car-wheels used for railroad rolling-stock in this country are made either of chilled iron or of softer substances, such as papier mache with a steel tire. There were 600,000 tons of charcoal iron manufactured in the United States last year, and of this amount fully one-half went into chilled iron car-wheels. For some time past, however, the increasing weight of passenger, not especially freight loads which the wheels have to bear up, has convinced manufacturers that solid steel would have to be used as material. The establishment which is to be set up at Norristown is somewhat experimental, but if rolled-steel car-wheels shall prove valuable in service, the industry is capable of indefinite expansion, owing to the immense demand for railroad cars all through the country.

NEW MACHINE FOR THE RECOVERY OF METALS. A new machine for the abstraction and recovery of valuable metals from earth, sand, clay, slag, the sweepings of jewellers' shops, and other refuse, has been perfected by Mr. T. Bodworth Sharp of Muntz's Metal Works, Birmingham, England. The machine, which is called "The Hydraulic Separator," consists of a tube with two chambers. Into the upper chamber the refuse is introduced while water is slowly rising in the lower tube at a regulated speed, and while the metals sink into a receptacle, the earthy particles are carried over the top of the tube into the refuse tank. The principle on which this invention is based is that, assuming certain metal particles sink in still water at the rate of 30 feet per minute, whereas earth sinks at the rate of 20 feet, it

follows that if the water is caused to rise in the tube at the rate of 25 feet per minute, the metal will sink to the bottom at the rate of five feet per minute, while the particles of lighter specific gravity are washed away. The apparatus has undergone various tests with complete success. One test was the placing of a quantity of small shot in two barrowfuls of refuse, with the result that the whole of the shot was recovered, while the refuse was carried away. The machine is exceedingly simple of construction, requiring no skilled labor, and the economy is such that at one of the leading works in the Midlands metal of the value of several thousand pounds is annually recovered. The invention is not only valuable to copper-smiths, brassfounders, tin-plate manufacturers and jewelers, but is claimed to be most effective for gold-mining purposes, and several of these hydraulic separators are now being sent to the South African gold-fields.—*Iron and Coal Trades Review, London.*

A PERFECT TIN-CAN MAKER.—The Philadelphia *Ledger* describes a new machine for the manufacture of tin cans as follows: The machine is about 50 feet long. The flat tin of a proper size for a can is placed on an endless chain at one end. It then passes into a machine, where the tin is rolled into the shape of a can and the edges fastened. A series of gas jets next heat the partly made can, and a pot of solder distributes its metal along the edge. The can then passes by a sharp turn to a traveler, where fingers grasp it and hold it in position as the top and bottom of the can drop through a slot into position. Another series of gas jets and solder further on fix one end, and then, by an ingenious movement of the traveler, the other end is presented to still another series of gas jets and solder, and the can is ready for use. It was just 45 seconds from the time the flat sheet of tin was placed in the machine until it passed out, 50 feet away, a finished can.

IRON AND STEEL.—While the population of the United States during the past ten years has averaged about four per cent of the estimated population of the globe, the consumption of iron and steel in this country has averaged 30 per cent of the world's consumption and now exceeds 40 per cent. The consumption of iron steadily increases, notwithstanding the recent enormous reduction in its use for railway purposes. Both iron and steel are being used more and more widely every day in buildings, bridges and other structural work; and while the American product for 1889 will exceed that of Great Britain, it is not large enough to supply the home demand. One cause of the extraordinary growth of the iron and steel industries is the cheap conversion of iron into Bessemer steel and the ready adaptation of steel to structural shapes for ships, bridges and buildings into nails, wire, axles, springs, tools, shafting, etc.

PRICE OF STEEL.—Steel is now from 30 to 40 per cent dearer than it was in 1887. This, says *London Invention* of Nov. 30th, will sensibly affect the naval defense scheme, and will cause the cost of the building of ironclads to be £30,000 per ship more than was calculated. There is also a proportionate increase in work, so that much delay will be incurred in obtaining the delivery of plates and angle bars. This will likewise add from three to four months in the construction of a cruiser. With America, according to Mr. Carnegie, making steel rails as cheaply as England, and according to Col. Shook, making iron at \$2 a ton less than it can be made for in England, it looks as if protection is anything but a failure.

THE IDEA OF THE RAILWAY THREE CENTURIES OLD.—Hitherto it has been supposed that English miners in the middle of the 18th century first utilized parallel rails, like the modern railway tracks, in the transportation of burdens. In a "Description of the World," by Sebastian Munster, 1541, a woodcut has been found containing a representation of a little four-wheeled car loaded with ore, and with a man behind shoving it along parallel rails. The scene of the woodcut is in an Alsatian mine of the first part of the 16th century. Munster calls the car in question instrumentum tractorum, and mentions that its four wheels were of iron.

Bronze for Axle-Boxes.—With the large high-speed locomotives that do so much work on the New York Central, there has been more or less trouble with the cast-iron axle-boxes breaking, and Mr. Buchanan has been trying bronze with decided success. There is now a likelihood of this material being adopted as the standard for all passenger locomotives, and its use may be extended to all classes of engines.

ANNEALING STEEL.—A good method of annealing steel is to let it "soak" in the fire until red hot, as it heats more evenly; then take it from the fire and carry it to some dark place, let it cool in the air until you lose sight of the dull red in the dark, and then cool it off in hot water. This method is called the "water anneal."

WIRE NAILS.—In 1886 the production of wire nails was about 600,000 kegs, made by 27 wire-nail works; in 1887 the production was estimated to have been 1,250,000 kegs, made by 47 works; and in 1888 the production is estimated to have been 1,500,000 kegs, or 150 per cent more than in 1886.

SCIENTIFIC PROGRESS.

Scientific Progress in 1889.

In Astronomy.

Considerable progress has been made during the year in photographing certain nebulae and other star clusters. Photography has also brought to light many very faint (gaseous) nebulae which the telescope fails to detect. The moon's surface has also been photographed and its minutest details brought out with a distinctness hitherto unknown.

The 1475 photographs of the transit of Venus for 1882, taken by the American astronomers at Washington and elsewhere, have been reduced, and the solar parallax resulting therefrom is 82 in. .847, which corresponds to a mean distance of the earth from the sun of 92,385,000 miles, with a probable error of only 125,000 miles. These numbers are no doubt close approximations to the truth, but they cannot be regarded as final until all the observations made by astronomers in other countries are reduced and discussed. From the known values of precession, aberration, nutation, and all the other factors which can in any way enter into the solar parallax, Prof. Harkness of the Naval Observatory at Washington has, on theoretical grounds, deduced a parallax of 8 in. .836=0 in. .004, which gives a mean distance of 92,504,000 miles, with an exceedingly small probable error. With this value, the sun's diameter comes out 861,670 miles.

Five new asteroids have been discovered this year. They are all exceedingly small bodies for primary planets, and are situated in that immense region between Mars and Jupiter.

A very valuable discovery of great practical importance in the manufacture of astronomical telescopes has been made by two distinguished German physicists, Prof. Abbe and Dr. Schott of Jena, Germany. The great defect in all large telescopes of the refracting kind is the secondary spectrum, due to the fact that the lenses composing the object-glass do not focus all the refracted rays at the same point. By using different kinds of glass, opticians have succeeded in bringing together two widely differing rays of light, the red and the blue, but have not succeeded in bringing together all the other intermediate rays, so as to form a colorless image, owing to what is called "the irrationality of dispersion." After numerous experiments and extensive research into the chemical nature of various kinds of glass, German physicists have succeeded in practically reducing the secondary spectrum, or the color correction, to zero in the new glass they have made. It is also claimed by the discoverers that the tool for visual and for photographic purposes are identical. All the telescopes hitherto made of the new glass have proved quite satisfactory in these respects.

In Chemistry.

A new metal has been discovered in both nickel and cobalt. Gnomion is the name proposed for it. Experiments on the compressibility of oxygen, nitrogen and hydrogen gases show that under a pressure of 15,000 pounds per sq. in. the compressibility of these gases is no greater than that of liquids, and increases in proportion to the temperature. If the density of water be taken as unity, the density of oxygen under a pressure of 3000 atmospheres is 1.1054, that of air 0.8817, of nitrogen 0.8293, and of hydrogen 0.0887. These facts have an important bearing on the physical constitution of the sun, whose interior is now regarded as a vast mass of gaseous matter under enormous pressure.

In Solar Physics.

M. Jansen of Paris has made an important discovery in solar physics. By spectroscopic observations made on the top of Mt. Blanc he has shown that oxygen does not exist in the sun. His observations show that the hand and lines of oxygen previously identified by him and others in the solar spectrum are due entirely to the earth's atmosphere. These systems of lines in the red, yellow and blue portions of the spectrum, which are known to vary with the square of the density of the absorbing oxygen, were altogether wanting, and the groups of dark lines in other parts of the spectrum, which vary simply as the density of the absorbing medium, were so faint as to leave no doubt of their total disappearance, provided we could entirely eliminate the effects of the earth's atmosphere. He has also repeated his observations on the top of the Eiffel Tower, and confirms his former results. Further researches in this direction are required to settle the matter definitely.

Explorations.

During a cruise of deep-sea soundings on a line extending from New Zealand to the Tonga or Friendly Islands, undertaken by Her Majesty's ship *Egeria*, an extraordinary depression of five miles and 168 feet was found in latitude 24° 37' min. south, and longitude 135° 8' min. west. Several other depressions were found near the same locality, varying from 3,006 to 43,000 fathoms, all of which appear to be crater-like depressions in a tolerably shallow sea.—*Baltimore Sun.*

WHILE THE LAWS OF GRAVITY are, no doubt, sufficient to explain the movements of the celestial bodies with respect to each other, there are some obscure movements which have long been investigated without any very satisfactory results; but the electro-dynamic theory is one which has often been suggested to

account for them. This theory is indeed gaining ground for more than one reason. In the light of recent experiments, and in connection with the material properties of the electric current as now generally understood, it would seem that the "ether" is not to be considered, as heretofore, the medium through which the force binding the celestial bodies to one another acts, but that it is the actual hindling element itself, fulfilling all the properties of an incompressible, highly elastic fluid. So substantially says the *Electrical World*.

TAKING AIM IN SHOOTING.—Shooting, says *Forest and Stream*, is very much like driving a nail. Does a carpenter ever take aim with his hammer, or a spikeman on a railroad with his long, swinging stroke at arm's length watch his maul as it goes around over his head to see if it is coming down in the right place? If he did, would he be apt to hit the spike? When I commenced trap-shooting I thought it was necessary to lay my cheek down on the gun stock and screw around until I got my eye and the sight in a line with a glass ball. That was before the day of clay pigeons and blue rooks. Consequently I was more often at the foot of the class than at the head. One time, after so many misses that I became ashamed of myself, I got reckless and didn't care whether I scored or not. I called "pull," drew up my gun, watched the ball fired, and was as much surprised as were my companions to see the ball go to pieces. It took me some time to get the idea, but I finally got it, and thereafter I seldom saw the sight or even the gun when I pulled the trigger, and my success was surprising. I applied the same rule to field shooting, and, without boasting, my hunting companions sometimes tell me to my face that I can shoot. Of course allowance must be made for birds crossing, rising or falling, but that is intuitive and seldom thought of by our most successful shots. Indeed, thinking has little to do with it. If it had, one's bird would be out of range before he could collect his thoughts.

COUNTERFEITING RENDERED IMPOSSIBLE.—The *Paper Trade Journal* says: The large and continually increasing demand for paper, which cannot be duplicated by unauthorized parties, for use in printing certificates of stock, bonds, drafts, notes, commercial paper, etc., has led to the production of a paper of peculiar designs. A lately patented process for making paper of this description consists in applying ink to a lithographic plate of stone or other material, placing another plate, which may also be a lithographic plate, face to face with the first-named plate, rubbing the faces of the two plates together for a time and then taking them apart. The ink will be so distributed by the rubbing action that a variegated design will be produced upon the plate. If this design is not pleasing, the plates are again placed together and the rubbing continued until a satisfactory design is produced. The ink is then allowed to dry and the lithographic plate is subjected to the usual treatment for lithographic purposes, and the design is transferred to the paper in the usual manner of printing from lithographic plates. This process is said to produce designs of such infinite variety of configuration and shade that reproduction, except from the original plate, is practically impossible. The impression may be made in any desired color.

ZERCON.—WHAT IS IT?—Zercon is a metal not found pure. In fact, no use for the pure metal has ever been found, therefore it has not been reduced. An oxide of this metal, called zerconia, is the most infusible of all the known oxides. The oxide is reduced to a fine powder. A common cotton wick is thoroughly filled with the powdered oxide, then the cotton is burned out. The wick is all consumed excepting a thin, delicate, snow-white column of the zerconia, which is left exactly the shape of the wick. As the burning gas impinges upon this column of oxide, the latter becomes heated white hot and glows with a soft incandescence, second only to the electric light. A mechanic may not know the name of this burner from the above description, but it is named the welshack and by that name will be readily recognized.—*N. W. Mechanic.*

ARTIFICIAL PROPAGATION OF THE SPONGE.—A new industry in artificially cultivated sponge is in process of creation. M. Oscar Schmidt, professor at the University of Graz, in Styria, has invented a method by which pieces of living sponge are broken off and planted in a favorable spot. From very small outtings of this kind Prof. Schmidt has obtained large sponges in the course of three years at a very small expense. One of his experiments gave the result that the cultivation of 4000 sponges had not cost more than 225 francs, including the interest for three years on the capital expended. The Austro-Hungarian Government has been so much struck with the importance of these experiments that it has officially authorized the protection of this new industry on the coast of Dalmatia.

A NEW CALCULATING MACHINE has just been invented in France, and obtained a gold medal at the exhibition. The inventor is M. Bollee of La Mans, a clever machinist, already very favorably known by other useful inventions. The machine does addition, multiplication and division with astonishing rapidity, and all by a turn of the wheel.

GOOD HEALTH.

Health of the State.

No Serious Epidemics Reported.

The secretary of the State Board of Health has issued his report for the month of December. The figures given show a pleasing state of things regarding the health of the State. Reports received from localities representing a population of 781,000 give the number of deaths at 963, a percentage of 1.23 in the 1000, or an annual mortality of 14.76, which is a little higher than the previous month's rate. This is considered a very favorable report when compared with the general average of mortality throughout the country.

Reports received from 100 localities indicate an absence of serious epidemic disease within the State. The extreme moisture and cold which prevailed during the month increased in a marked manner the frequency of all affections of the respiratory organs, with a corresponding fatality from consumption, pneumonia and bronchitis.

Typhoid fever is quite prevalent throughout the State, and influenza is also reported quite prevalent, although not having as yet attained the severity which characterizes the disease as reported from Europe and the Eastern States. It is undoubtedly the same disease, and will become epidemic, although the type may be milder. No deaths from it have yet been reported, but many of our correspondents agree upon the fact that the disease is characterized by that extreme debility which is likely to prove fatal to the debilitated, or those suffering from previous sickness, or in the very aged.

The month has been marked by an unusual number of storms upon the Pacific Coast. Rain fell in Oregon and Washington on 19 days, in Southern California on 18 days, and in Northern California on 24 days.

The mean temperature of the month was slightly above the normal temperature for December in Southern California, and slightly below the normal in other Pacific Coast districts.

In Western Washington and Northwestern Oregon the rainfall for the month was less than the average December rainfall. In all other districts the precipitation was greater than the normal amount, particularly in California, where no station reported less than twice the usual amount. At several California stations more than five times the normal rainfall was reported.

LONG LIVED PEOPLE.—The Norwegians are said to be the longest-lived people in the world. Official statistics show that the average duration of life in Norway is 48.33 for the men, 51.30 for the women, and 49.77 for both sexes. The duration of life has increased in late years. The director of the Statistical Bureau of Norway, who is authority for the above, says: "If the mortality in Norway is 17 per cent more favorable than in Central and Western Europe, it is greatly due to the comparatively slight mortality among our youngest children." To what particular cause this comparatively slight mortality among children is due we are not told, but probably anxious parents in warmer climates may take a hint from it and make inquiries.

THE INFLUENCE OF OLIVE OIL ON BILIARY SECRETION.—A late number of the *Medical News* says that the usefulness of olive oil in biliary colic seems to be substantiated by the recent experiments of Rosenberg, who, in dogs with permanent biliary fistula, finds that large doses of olive oil greatly increase the flow of bile and decrease the specific gravity. If future experiments prove the accuracy of the statements that olive oil assists the passage of calculi, not, as maintained by the supporters of the treatment, as a lubricant, but by increasing the secretion of bile and washing out the gallstones, it will probably be widely adopted if the patients do not object to the dose.

PALPITATION OF THE HEART.—A French physician announces that distressing or excessive palpitation of the heart can always be arrested by bending double, the head down and the hands hanging, so as to produce a temporary congestion of the upper portion of the body. In nearly every instance of nervous palpitation the heart immediately resumes its natural function. If the movements of respiration are arrested during this action, the effect is still more rapid.

A NEW SUBSTITUTE FOR TOBACCO is being introduced. It is a mixture of British herbs—the particular plants are kept secret—and smokers who have tried the compound declare it to be deliciously fragrant, slightly exhilarating, and withal soothing to the nerves. Combined with ordinary tobacco it is said to make a blend as satisfactory as that of chicory or coffee. At present it is prepared in Scotland, under the name of "herb tobacco," and it has rapidly grown in favor with all classes in the north.

WHITE OR BLACK.—Experiments at Leipzig, Germany, show that skin grafted from a white to a colored person becomes gradually black, and the black skin grafted upon a white person in time becomes white.

PATENT-MEDICINE CENTER.—St. Louis is now the great distributing center of the country for patent medicines. Its dealers in such goods reach more than 4,000,000 purchasers.

USEFUL INFORMATION.

Cheaper Transportation.

The American public does not appreciate or give due credit for the remarkable reductions in the charges for railroad transportation which have been made within the past few years and are still going on. The St. Louis *Republic* referring to a tariff sheet of the Chicago & Alton road dated April 20, 1863, gives the following example of rates per hundred pounds from East St. Louis to New York 27 years ago compared with those now in force:

	1863.	1890.
Cord.....	\$0 23	\$0 95
Flour, per barrel.....	50	1 90
Brick.....	20	95
Pig lead.....	20	95
Cotton.....	30	2 50
Beer.....	35	1 60
Dressed beef.....	55	2 50
Hides, dry.....	87	2 50
Hides, green.....	85	95
Flour, in bags.....	29	1 60

In what other department of industry have charges decreased from 75 to 87½ per cent in the last 27 years?

LUMINOUS PAINT.—Until recently the commercial manufacture of luminous paint has been confined to England, where a single factory turns out a small supply at a price of about \$3 a pound. This enormous cost seems to have prevented the use of the paint except as a curiosity. During the past year, however, a firm in Austria has found means to produce it and place it on the market at 50 cents a pound, or about one-sixth of the English price. Even at 50 cents a pound, a substance composed of roasted oyster shells and sulphur might be manufactured at a good profit, but at that price it is likely to come into extensive use. Wherever it can absorb light during the day it will give it forth at night, and it is said that a railway car in England, which has had its ceiling painted with it, was so brilliantly illuminated that one could see to read a newspaper in it during the darkest night, without other light. With all due allowance for the enthusiasm of early experimenters, there is no doubt that cars with ceilings so painted would be pleasant to ride in whether one could really see to read in them at night or not; and for making keyholes, stairways and sign-boards luminous, the paint would be invaluable. Its application to stairways is a particularly obvious one, and the Austrian manufacturers furnish a kind of wall paper on which the paint can be used to better advantage than on the bare plastering. The paper, which is of a leathery texture, is first treated with lime-water, and then primed with a composition furnished by the same firm. After this is dry, two thin coats of the luminous paint are applied, and the whole may then be varnished.

CARBONIZED SAWDUST FOR FILTERING.—Carbonized sawdust, saturated with certain chemical compounds, has recently been introduced into Germany as a material for filtering and at the same time discoloring liquids. Sawdust treated first with slum, and then with sodium carbonate, becomes impregnated with a precipitate of aluminum hydrate, which adheres firmly to it. After being well washed with a solution of barium chloride until no precipitate is given, the sodium sulphate simultaneously produced is entirely removed, and then prepared sawdust is ready for use. Colored liquids filtered with it have their color entirely removed by the formation of flakes with the aluminum hydrate present in the filtering material. A sawdust similarly saturated with barium chloride is used for filtering liquids, from which it is required to remove calcium sulphate, and for the removal of calcium carbonate from a solution a sawdust that has been treated with magnesium sulphate and caustic soda is employed.

TO MEND TERRA-COTTA.—Terra-cotta ware that is broken upon a slant, either outward or inward, can be mended by roughing the broken surfaces with a chisel or hammer, then placing the pieces together and pointing them with a mixture made of 20 parts clean river sand, two parts litharge and one of lime, made into a thin putty with linseed oil. If the terra-cotta is very red, the putty can be colored with Venetian red. If other colors are desired, yellow ochre or Spanish brown will give the desired shade. Two pieces of stone, brick, or similar material can be united with this cement. Sometimes it is used for covering the outside of brick buildings to make them look like stone of different kinds.

THE LATEST THING IN GLOVES.—The carrying of money in the glove is a fixed habit among the female shoppers of all large cities in this and all other civilized countries. Glove manufacturers have at last recognized the custom and made preparations to meet its requirements. The very latest "thing" in gloves is a palm pocket attachment, roomy enough for a respectable roll of bills or all the "small change" necessary for the current expenses of an afternoon among the stores. It is selling readily in Paris, and has just made a very successful entree in the American market.

ELECTRIC LIGHTING is said to be one of the hardest kinds of work for a steam engine. The continuous running and the work being thrown on and off instantaneously cause an immense strain.

ELECTRICITY.

The Materials for Electric Wires and Cables.

A discussion of electrical matters would be incomplete without reference to the important adjuncts, electric wires and cables. What belts and pulleys are to a steam system, the wires and cables are to an electric system. They are the conveyors or transmitters of the current, and through the current of the light, heat, power or sound.

The different materials from which wires might be made present an interesting property called conductivity; that is, some convey the current much more readily than others, the sizes of the conducting pieces being equal. In a water analogy, a poor conductor offering resistance to the passage of the current may be compared to a pipe with a rough and ragged interior, when the friction would materially reduce the flow. A few figures will show these differences.

Taking the conductivity of pure copper as a maximum and giving in an arbitrary value of 100, the relative conductivity of wrought iron is 16; of pure lead, 8; of mercury, 6; of silver, 100; of gold, 78; of platinum, 10.6; of aluminum, 54.2. For telegraphic practice where the current is weak, galvanized wire is almost universally used. Much the same wire is used for short-distance telephone lines, but the long distance and metallic circuit lines are now using copper wire entirely.

The high-pressure currents for lighting and power require wires and cables of the highest conductivity and carefully insulated to prevent leakage of the electrical current which not only reduces its working capacity but endangers life and property.

The need of durable and reliable insulated wires has led to the establishment and growth of an enormous industry for the manufacture of such wires and cables. The requirements to be met with are often of the most trying nature, and the problems of wire manufacturers have been difficult in the extreme. Not only must the covering exclude the air in dry weather, but must stand the storms of every season, must resist the action of gases and vapors in chemical works or in sub-surface conditions, must even allow total submersion under water for indefinite periods, besides possessing a toughness that will be proof against the rubbing or chafing of other wires and the wearing action of gravel or sand.

When it is realized that almost every accident or casualty due to electricity is either directly or indirectly traceable to defective insulation, the importance of attention to this branch of the industry is seen, and to obtain a perfectly safe insulated wire is the work of manufacturing companies that have already done so much toward improving the quality of electric wires and cables.—*Boston Advertiser.*

The Electric Telegraph Suggested 200 Years Ago.

The R. v. Canon Jackson of Leigh Delamere, Chippendale, writes as follows to the *Bath Chronicle*: "Joseph Glanvill, sometimes called 'Sadducismus Triumphans Glanvill,' rector of Bath from 1666 to 1672, was a learned writer upon abstruse and mystical subjects, but in a style of which it is not always easy to catch the meaning. In one of his treatises, called 'The Vanity of Dogmatizing,' printed in 1661, Chapter XXI, he is speaking of 'supposed impossibilities, which may not be so.' In the concluding sentence of the following passage he seems to have anticipated the electric telegraph: 'But yet to advance another instance. That men should confer at very distant removes by an extemporary intercourse is a reputed impossibility; but yet there are some hints in natural operations that give us probability that 'tis feasible, and may be compassed without unwarlike assistance from demoniacal correspondence. That a couple of needles equally touched by the same magnet, being set in two dial exactly proportioned to each other, and circumscribed by the letters of the alphabet, may effect this 'magnale' (i. e., important result), hath considerable authorities to avouch it. The manner of it is thus represented. Let the friends that would communicate take each a dial, and having appointed a time for their sympathetic conference, let one move his impregnate needle to any letter in the alphabet, and its affected fellow will precisely respect the same. So that would I know what my friend would acquaint me with, 'tis but observing the letters that are pointed at by my needle, and in their order transcribing them from their sympathized index as its motion directs; and I may be assured that my friend described the same with his; and that the words on my paper are of his inditing. Now, though there be some ill contrivance in a circumstance of this invention, in that the thus impregnate needles will not move to, but avert from, each other (as ingenious Dr. Browne hath observed), yet this cannot prejudice the main design of this way of secret conveyance; since it is but reading counter to the magnetic informer, and noting the letter which is most distant in the antecedent circle, from that which the needle turns to, and the case is not altered.' Now, though this desirable effect possibly may not yet answer the expectations of inquisitive experiment, yet 'tis no despicable item, that by some other

such way of magnetick efficiency it may hereafter with success be attempted, when magical history shall be enlarged by riper inspections; and 'tis not unlikely but that present discoveries might be improved to the performance."

ACCIDENTS FROM ELECTRICAL WIRES.—That Boston should have been seriously scorched on Thanksgiving Day by the mad energy of crossed electrical wires, says an exchange, argues nothing against the use of the electric fluid as an illuminator or mechanical motor. It simply indicates the imperfection which attends the introduction of all dangerous systems into social life, but which the age of improvement will in time render innocuous, as their nature becomes better understood. Lives have been sacrificed and property burned, and there will be more of these disasters until the time arrives when proper safeguards, born of these rude experiences, will be adopted and life and property will be no longer jeopardized. The first Atlantic voyage of Columbus was a hazardous and fearful adventure; a voyage to Europe is now a safe and pleasant pastime. "Time conquers all things" in more senses than one.

VAST ELECTRIC MOTIVE-POWER FOR PORTLAND.—A committee has been appointed in Portland, Me., to consider the subject of developing the industries of that city by obtaining electric-power from the Presumpscot river. It is said that a syndicate with a capital of \$300,000 has been formed, and that they now own the vast water-power on the Presumpscot, above the point where the large dam of S. D. Warren & Co. has been put in. It is claimed that when it is properly developed a manufacturing power equal to the combined power at Saco, Biddeford, Auburn, Lewiston and Lowell will be obtained, and that with that power at the command of the citizens of Portland, this may be made a great manufacturing city. The Warren "plant" will be in addition to this new scheme and the combined power might be almost beyond calculation.

ELECTRICITY IN MINING.—The Nevada mill at Virginia City, of 60 stamps, is now run by electricity. The plant is one of the largest in the world, and transmits on copper wires. The power is generated in the dynamo chamber, which is located on the Suto tunnel level of the Chollar incline, 1630 feet below the surface, and transmitted to the motor-room located on the surface, a total distance of 2300 feet. The dynamos are operated by Pelton wheels driven by a volume of 187 inches of water flowing down the shaft through ten-inch iron pipes. Sixty-three and one-third per cent of the power generated is landed in the surface motors. The plant has been in constant operation for three months under the supervision of Horace S. Conner, the electrician for the Brush Company.

A NEW CELL.—Report says that Mr. Edison has perfected a new cell for telegraphic use which possesses some remarkable points in its favor. A cylinder of zinc, and inside this a thick stick of caustic soda in water, constitutes the cell. It is claimed to have an internal resistance of only 0.025 ohm., and permits a discharge of 15 amperes, with an inappreciable loss by local action; an E. M. F. of about one volt., and to be free from polarization, and never needs cleaning. These are very wide claims, and if they are substantiated in practice the cell will have an extensive field of usefulness.

THE PAPER-MILLS of the L. L. Brown Co., Adams, Mass., will be run by electricity in a short time. They are now investigating a scheme for applying electricity in driving the machinery. A mile above Adams there is a 30-foot fall in the river, and the company proposes to put up an electrical plant to be run by the water-power thus obtained, the electricity being carried by wires to the mill. The engine now used is of 200-horse power, and if sufficient water-power can be obtained to run a dynamo strong enough to drive the machinery, the project will be carried through.

ELECTRICAL TOOTH EXTRACTOR.—An electrical instrument has been invented which is designed to remove the pain incidental to the extraction of teeth. It consists of adjustable, pivotally connected prongs carrying buttons and connected with an electrical battery, the buttons being placed on the face over the nerves leading from the teeth to the brain, and a circuit established the moment the tooth-extracting instrument touches the tooth to be removed.

TELEPHONES.—The action of France with regard to telephones appears to be contagious, and it is now announced by an Italian contemporary that the Italian Government intends to monopolize the telephone system in that country. Our own Postmaster-General also has designs on the telephone companies as soon as the patents of the National Telephone Company run out.

ELECTRICITY IN SOUTH AMERICA.—Quite a number of Boston firms are shipping large consignments of electrical goods to South American countries, and from what they state it seems evident that matters are in a fair way for the opening up of a great market in South America for United States electrical goods.

ELECTRICAL ENGINEERING.—The polytechnic institute at Worcester, Mass., has introduced a new course of electrical engineering leading to the degree of bachelor of science.



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Business Announcements.

[NEW THIS ISSUE.]

Assessment Notice.—Gray Eagle Mining Co. Situation Wanted—"J. A." Box 2517.

See Advertising Columns.

Passing Events.

The stormy weather still continues and the railroad lines in the Sierras and Siskiyou are blocked with snow. Hundreds of men and all the plows are at work, with but little success, however, as the snow drifts into the cuts as fast as it is removed.

No bullion was received from the mines this week, as the express companies have refused to receive any in the snow-blockaded districts.

Mining matters are pretty much at a standstill in this State and in Nevada, owing to the storm. On the Comstock no ore shipments can be made, and in this State many mills have been compelled to stop owing to the freezing of water supply. Hundreds of miners are temporarily out of work.

Unprecedented snow and rainfalls have been experienced in all directions. All the mountain towns are covered with deep snow. In some places on the railroads it is from 25 to 40 feet deep. Travel has been obstructed and business demoralized. We have had no letters or papers from north or east for a week past.

JUDGE LORENZO SAWYER, who decided the famous debris case, may resign shortly from the federal bench and retire on his pension.

The Latest Silver Bill.

On last Monday two important silver bills were introduced into the House of Representatives. One was drafted by Secretary Windom, and the other by Colonel Kirby, the veteran financial editor of the New York *Journal of Commerce*. Secretary Windom's bill is in the same line as suggested in his annual report to Congress, which was published at the time in the MINING AND SCIENTIFIC PRESS. He neither adds to nor makes any changes, and therefore it is objectionable alike to the silver and gold men. The more his bill is studied the more convinced must even the most obtuse be that there is not only "a negro behind the fence," but if enacted into a law as introduced, the result will be to make silver more of a commercial commodity than it is now. There can be no doubt but the bill will meet with strong opposition and he relegated to a back seat. If absolute free coinage cannot be secured, then Colonel Kirby's bill commends itself in more ways than one as a compromise measure; not the least of which is the placing of silver on the same footing with gold by making provision for free coinage on and after January 1, 1892. The text of the bill as telegraphed is as follows:

SECTION 1. From and after the 1st day of January, 1892, any owner of gold or silver bullion may deposit the same at any mint in the United States, to be formed into coin or bars, for his benefit, in the manner now prescribed by law for gold bullion.

SEC. 2. After the 1st day of January, 1892, the owner of any gold or silver bullion, or of any gold or silver coins of the United States, may deposit the same at the Treasury, or any sub-treasury of the United States, in even multiples of one dollar, and shall receive for the same legal tender notes of such denominations authorized by law as he may demand.

SEC. 3. After the 1st day of January, 1892, legal tender notes of the United States shall be substituted, as soon as possible, for all gold and silver certificates outstanding, and all gold and silver certificates paid into the Treasury of the United States after the 1st day of January, 1892, shall be canceled and destroyed, and legal tender notes of like denominations shall be issued in lieu thereof.

SEC. 4. The Secretary of the Treasury is hereby directed to purchase for coinage each month the maximum amount of silver bullion authorized to be purchased by the existing law from the date of the passage of this Act to December 31, 1891.

SEC. 5. After the 1st day of January, 1892, no gold or silver bullion shall be purchased for or on account of the Treasury of the United States, except so much as may be necessary to carry out the provisions of the Act to provide for the redemption of specie payment, as provided January 14, 1875, and as amended by this Act; provided that any bonds issued for the purchase of gold or silver bullion shall bear interest at not less than 2 per cent per annum, and shall be payable, principal and interest, in gold or silver coin, or bullion, or legal tender notes, at the option of the holder, and shall not be sold for less than par in gold or silver coin of the United States, or the equivalent thereof in bullion, and shall be payable at the option of the United States after ninety days' notice, to be given by the Secretary of the Treasury.

SEC. 6. After the 1st day of January, 1892, all legal tender notes of the United States shall be redeemed in gold or silver coin or bullion at the option of the holder, and when redeemed may be released from time to time as public interest may require, and shall be received in payment of duties on imports.

The above ought to go still further and make the legal tender quality of silver coin up to \$100. Experienced financiers say that no reasonable excuse can be given against increasing its legal tender quality, and if done, silver will take care of itself. The bill ought to go still further in another direction, and make the United States the sole issuer of paper currency, and in pursuance of this policy force the retirement of national bank notes. Cleveland's administration broke up that monster of corruption, the "Navy Ring," and if Harrison's administration breaks up the National Bank ring, it will deserve equal commendation.

"Dope" for Snow-Shovels.

As a goodly number of the people of California, Nevada, Idaho, Montana and Utah are about these times engaged in shoveling snow, any hint to help them in their work ought to be acceptable. It is very generally known that snow is apt to stick to the shovels and clog them up, so they have to be scraped frequently; but it may not be generally known that there is a way to avoid this and make the work easier. Up around Truckee and that vicinity, where they know something about snow-shov-

eling, a "dope," something like that used on California snowshoes, is applied on the shovels. The snowshoe dope, which keeps the shoes free from snow, is ordinarily made of beeswax, resin and tallow. By mixing these ingredients together, though with more resin and less tallow than for snowshoes, a compound is made which, applied on the shovels, keeps them from clogging with snow. The dope is about the consistency of shoemakers' wax, and is applied by rubbing in little dabs and then spreading it evenly by rubbing until a coating is evenly put on, not too thick, and a polished surface is thus obtained, from which the snow readily slides off.

The shovel should be slightly heated and the dope applied to the blade and up the handle for about a foot. This makes a smooth glazed surface which will last from a day to a week, according to the character of the snow and the amount the shovel is used. Paraffine is better than tallow for this dope, but not so easily obtained. Any one who has ever used a snow-shovel covered in this way will decline an undoped one for the future, as the work is rendered so much easier.

The Storm.

We have had no such continued stormy weather in the State since the memorable winters of 1853-4 and 1861-2, until this year, but in some respects the winter is worse than any that has preceded it since Americans occupied California. The snowfall in the mountains is heavier than ever before known, and rain on the coast has been wonderful in quantity. In San Francisco up to Wednesday the total rainfall has been 30.24 inches, the heaviest, with one exception, since 1849. The exception was in the season of 1861-62, at the time of the great Sacramento floods, when the rainfall for January alone was 24 inches. South of us, at Felton, in the Santa Cruz mountains, they have had 65 inches, and at Boulder creek, seven miles from Felton, they have had over 81 inches this season.

But it is on the mountains where most of the trouble is being experienced. The trains are blocked in the Siskiyou and in the Sierras, and have been for a week, notwithstanding the snow-plows and armies of men that have been working to open the roads and release the trains. We have had no mails from the East or North for a week, and at this writing (Thursday) the railroad officials cannot tell when the blockade will be raised.

In many of the mountain towns of California and Nevada, owing to the blocking of railroads and impassability of other roads, provisions are scarce and high. In some places they are taking provisions in on pack-trains or snow-shoes. At Grass Valley the mines, all but the Omaha, have been closed since Saturday evening, 11th inst., causing a loss to miners alone of from \$1500 to \$2000 a day, to say nothing of the loss to the mining companies. The same state of affairs exists in most other mining districts. Ore shipments have been stopped and hands temporarily laid off. There have been no bullion shipments received for a week past, and Wells, Fargo & Co.'s express are refusing to receive any for the present, as they cannot transport it.

A number of quartz-mills and hoisting works have been crushed by the snow. The hoisting works and buildings of the Brunswick and Pennsylvania mines, Grass Valley, the Orleans mill, the buildings at the Gold Hill mill, the concentrating-room of the Laramie mill, the old Crosby smelting works and Fortuna hoisting works, are among those damaged.

Mining work has practically stopped in most of the camps in this State and Nevada. In fact out-door work of all kinds, except snow-shoveling, is at a standstill. Here in San Francisco and other coast cities there is more or less distress among the laboring population, numbers of whom have been unable to do any out-door work for a month or more past. Building operations have ceased, and no street work can be carried on. The mercantile community are doing little or nothing in business, as no goods can be shipped. All these things have brought about a stringency in money matters, a result due directly to the long-continued and exceptionally stormy weather.

ALBERT E. TYRUS, a well-known mining man, died at Oakland on Sunday.

Mine Superintendent's Reports.

Judge Shafter this week sustained the demurrer in the case of Theodore Fox against H. M. Levy and other directors of the Savage Mining Co. Mr. Fox sought to recover \$12,000 penalties alleged to have been incurred by the officers of the Savage Company on account of failure on their part to post up in their office certain information concerning the superintendent's report required to be published in that way. The decision virtually says the Act of the Legislature may be ignored and that the reports need not be posted.

By Act of April 23, 1880, it is provided that in case of the failure of the directors to have the reports and accounts current made and posted, they shall be liable to a penalty of \$1000, with costs of suit, to be recovered by any complaining stockholders.

This action was brought for the purpose of enforcing this penalty against the directors for the failure to post the superintendent's report, such failure having occurred for three successive months, as specified in the complaint.

The judge in his decision says: The question is, Were the directors obliged to publish the superintendent's report under the provisions of the statute? It seems to me that there are many reasons why the report of a superintendent should not be carried bodily into a balance-sheet or an itemized account of the directors and be posted. In the first place, it is impossible, not being within the power of the directors. While the corporation must be organized and doing business, having its principal office in this city, the mine may be in Mexico, in Nevada or in Colorado. The superintendent must, of necessity, be resident at the time. His duties are to be performed there. He is required to render his report to the directors on the very day that they are called upon to publish their itemized account. It will be seen at a glance that such an act on the part of the directors is impossible.

The subject-matter of the superintendent's report could not possibly be included in any such itemized statement or balance-sheet as mentioned in the first section of the Act. The provisions commanding the superintendent to make a weekly statement regarding the number of men employed and the rate of wages paid them would be unnecessarily carried into this account, as it would furnish no facts from which could certainly be ascertained the actual disbursement for labor. Nor can the superintendent be able by any possibility on the first Monday of the month to give a complete report, under oath, of the work done in the mine, the amount of ore extracted, what part of the mine taken from, what disposition has been made of the ore, what its assay value is, nor as regards the amount of bullion received or the manner of its final disposition. Nor could large quantities of ore which had been mined, and which remained piled in the mine or on the dump, be ascertained so that the superintendent could make a statement under oath regarding such amounts of ore, or of the value thereof. Nor could the discoveries of ores and minerals, and how the location of those ores were ascertained, nor the assay value thereof, be ascertained. Certainly the directors could not be held to make a statement under oath of the particular existence of these facts, having no personal knowledge thereof.

The final paragraph in the section seems to dispose of all the superintendent's report upon these very topics. It is provided there that all his accounts, reports and correspondence shall be kept in some conspicuous place in the office of said company and he open to the inspection of all the stockholders. In short, that the terms "posted" and "kept in some conspicuous place" have separate and distinct meanings, and that these several reports and accounts cannot be held to be included within that section providing for a penalty.

ASTRONOMICAL SOCIETY.—A meeting of the Astronomical Society of the Pacific will be held on Saturday evening. The following papers are announced: "The Lunar Rills Arledaens and Hyginus," by E. S. Holden, "Physical Observations of Jupiter in 1889, with Drawings," by James E. Keeler, "The Orbit of the Binary Star, Mn Heronias," by A. O. Lenschner, "A New and Simple Form of Electric Control for Equatorial Driving Clocks," by Jas. E. Kesler.

The Structure of Clay Slate Rocks.

Stratification or Bedding, Joints and Cleavage.

The term "Clay Slate" is now generally restricted to the sedimentary argillaceous rocks having a cleavage, and which can be split into thin plates like roofing slate.

The following analysis of ordinary Welsh roofing slate (blue) given by Professor Hull will be sufficient to show that the bulk of a slate deposit is made up chiefly of silica and alumina, and was therefore at one time ordinary clay:

Silica	60.50
Alumina	19.70
Iron (protoxide)	7.80
Lime	1.12
Magnesia	2.20
Potash	3.18
Soda	2.20
Water	3.30
Total	100.00

The color of the deposit at any given place depends upon the quantity and nature of the mineral matter which we see in smaller quantities is mixed up with it.

In examining some of the slate material under the microscope, the late Mr. David Forbes found a small quantity of greenish mineral, probably chlorate.

The ordinary color of slates is blue, of different shades. This color is derived from the presence of protoxide of iron. The red and purple varieties take their color, like the marls of the Permian strata, from iron in the form of peroxide; two parts of iron combined with three of oxygen. Into slate of a green color, which is the least common variety, iron less largely enters, and in a combination with magnesia gives them the greenish hue. In soft black slates there is a good deal of carbonaceous matter and sulphide of iron in a decomposed state finely disseminated throughout the mass.

The study of the Californian slate rocks is of the greatest importance to those engaged in gold mining; by some geologists they have been called aniferous slates.

Stratification, or as it is commonly called, bedding, is a term employed by geologists to denote a parallel structure in rocks, caused by the successive subaqueous deposition of layers more or less thick of mineral matter, previously held in solution or suspension in water, the arrangement being in layers or strata more or less horizontal and parallel to each other.

Although the planes of stratification in the slate rocks are usually spoken of as parallel, this is not strictly true; however, regarded on a large scale, stratification possesses all the general features of parallelism. In some of the older slates it is often a matter of considerable

difficulty to determine correctly the lines of original sedimentary deposition. In all slate rocks, no matter of what geological age, there will be observed numerous lines of fracture cutting through the slate rocks at angles differing more or less from the planes of bedding. These joints owe their origin to purely mechanical agency, as in the case of those accompanying the dislocation, elevation or depression of the land, by which a portion of the planes of bedding are fractured and displaced, termed by miners "a throw."

Referring the direction of joints in stratified rocks to lines of upheaval, Professor Sedgwick calls those which run parallel to the strike "strike joints," those parallel to the dip "dip joints," and all others he calls "diagonal joints."

Cleavage is that peculiar structure in slate rocks which renders them capable of being split indefinitely into thin plates, or lamina, and this in a direction independent of their bedding or stratification. These lines of

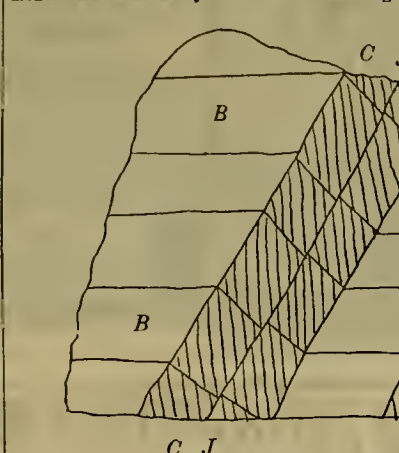


DIAGRAM OF SLATE-BED.

netic currents, so that we may readily conclude that the total result was facilitated by previous long-continued action of chemical and magnetic forces.

The accompanying sketch shows the three structures—bb the planes of bedding, jj the joints, and cc the cleavage.

Those Californian slate rocks met with in connection with what is called the "mother lode" and at different points where they are being quarried for roofing slates, slabs, etc., are by analysis about the same as the best north of Wales slates, containing the proportion of silica which seems necessary for the perfection of cleavage and toughness. Roofing-slate rocks are not confined to one geological period, though in Great Britain they only occur in the older formations, the Devonian, Silurian and Cambrian. Great mistakes have been made by some would-be colliers, who have taken the shale-beds (having a laminated structure) like those met with in carboniferous rocks and

reproduced in this country. I certainly know of no single work from which as good an idea of the recent triumphs of celestial photography is obtainable."

LOWER CALIFORNIA SILVER.—H. J. Patterson, an old prospector, has returned from San Felipe bay, 125 miles south of Yuma, on the Gulf of California. He brings silver ore from an 18 inch vein, which is found to be rich. He and two others lived 13 days on oysters after the supplies gave out, and while waiting for a schooner ordered to come from Guaymas, Patterson walked 124 miles to Alamo, killing quails and jackrabbits for food, and sent back supplies.

SAYS the *Lompoc Record*: There are now at work in the beach mines five companies, all doing well. There is nothing fabulous in these mines, but it is demonstrated that it pays to work them. With each recurring tide the mines are surcharged with gold, so that prac-

The Silk Industry in California.

Since the work of the State Board of Silk Culture has lapsed temporarily at least by failing to receive funds from the State, it is gratifying to note that experimental work has proceeded with the small appropriation of money by the U. S. Government under the painstaking and economical administration of the Ladies Silk Culture Society of California. There has been issued recently an interesting report in pamphlet form of the transactions of this organization for the fiscal year ending June 30, 1889. It comprises the report of the President, Mr. W. B. Ewer, the secretary, Mrs. L. E. Pratt, the Experimental Committee of which Mr. J. J. Rivers is chairman, and appended thereto is the financial statement as approved by R. J. Tramball and Edward Bosqui, Auditing Committee. A copy of this report, which can be had by application at this office, should be secured by every one in any way interested in this industry.

The report by President Ewer shows that the 15-acre Silk Experiment Station is progressing as well as the limited means at hand improvement will admit. The mulberry plantations are growing well and will soon supply an abundance of foliage of good varieties, which is, of course, at the basis of all feeding trials. It is to be hoped that by the time this requisite is arrived at the funds may be available for equipping the station buildings and other needed improvements. The president's report also alludes fittingly to the field for silk-culture and the various aspects of the industry as affecting the prosperity of the people. Silk-culture is advocated as a cottage or family industry and not as a corporate or capitalist undertaking. Filatures may be profitably conducted by capitalists, but the cocoons will be produced by family labor in the modest homes of the country. That is the way it is done in Europe and seems the most feasible and practical basis for its extension in this country.

The report shows that the Ladies' Silk Society did a very timely and important work in purchasing cocoons last summer when the State Board was obliged to suspend its operations. The financial report shows that there were purchased up to June 29th cocoons from between 30 and 40 producers, mostly ladies, resident in different parts of the State.

Mr. Rivers, as chairman of the Experiment Committee, makes an interesting report concerning a part of the work at the Piedmont Station, relating especially to the feeding of worms, the production of eggs, the killing of the obrysalis, etc.

It will be gratifying to the friends of silk-culture to know that the work has been continued so intelligently in this State in spite of the many obstacles which have been encountered.

Reverberatory Furnace.

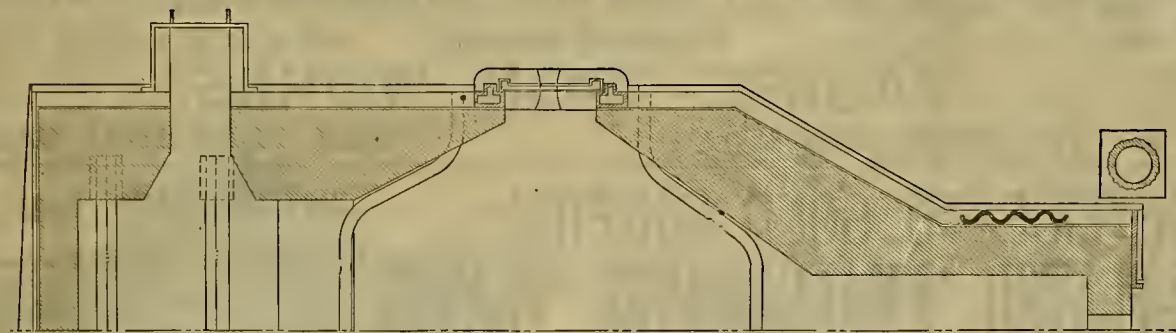
The accompanying cut shows a half-plan of a reverberatory furnace such as is used for ores. These furnaces are used for roasting ores in chlorination works, and are preferred by many to the different forms of mechanical furnaces where no hand-stirring is required. The reverberatory is very effective in its operation.

THE STATE UNIVERSITY.—The titles of the instructors, which were changed when the faculty was classified on "a commercial basis," have been restored, so that there are now more "professors" than there were a month ago. Among others, there is now a professor of mining and a professor of mineralogy and geology.

SECRETARY NOBLE has decided that a married woman can make timber-land entries or purchase such lands in the States of California, Oregon, Nevada and Washington, provided that it is conclusively shown that the entry is made for her own use and benefit, and not for the benefit of herself and husband jointly.

THE winter in the East has been so mild that the Pennsylvania collieries are shutting down and discharging their miners. Over one-third of the collieries have already shut down. These employ about 3000 men. The officials say that of 20,000 coal cars in service, 11,000, all loaded, are now lying along the road.

DURING 1889 the immigration into British Columbia, by the Canadian Pacific system, was 500 less than the number that departed.



HALF-PLAN OF REVERBERATING FURNACE FOR ORES.

sometimes forming the roofs of some of the seams of lignite for slate rocks.

The time is coming when the great value of our Californian slates for roofing, and also the manufacture of slabs into various architectural and domestic uses, will be better understood and will no doubt supersede the wooden and metal fittings now in use.

The slabs made into troughs, cisterns, and for sanitary purposes from their cleanliness, ought to supersede all other materials.

In 1880 the profit derived from the whole production of slates of North Wales, G. B., was taken as a million sterling. In this country the production yearly of roofing slate is valued at about \$2,000,000.

WILFRED T. NEWBERRY, of Placerville, and connected with mining affairs in this State, died of alcoholism at the Baldwin hotel this week.

THE average wealth of each man, woman and child of Colusa county is \$1500.

tically the mines are inexhaustible. For months the same ground has been mined over, week after week.

NEW LITHOGRAPH VIEW OF GRASS VALLEY.—We have received from Mr. H. S. Spaulding of the Grass Valley *Tidings*, a large and beautifully executed lithographic view of Grass Valley, Nevada county. The work appears to be a full and faithful representation of the town as it is at the present time. The streets, churches, and many of the principal dwellings, are distinctly shown in a bird's-eye view. All old residents of that beautiful mountain town should secure a copy. The map will be sent by mail, in a substantial paper cylinder, for 50 cents for one copy, or three copies for \$1. Address the *Tidings*, Grass Valley, Cal.

THE Tomstone Prospector says the mines must be pumped out and work started with outside capital or the whole country will go to the dogs.

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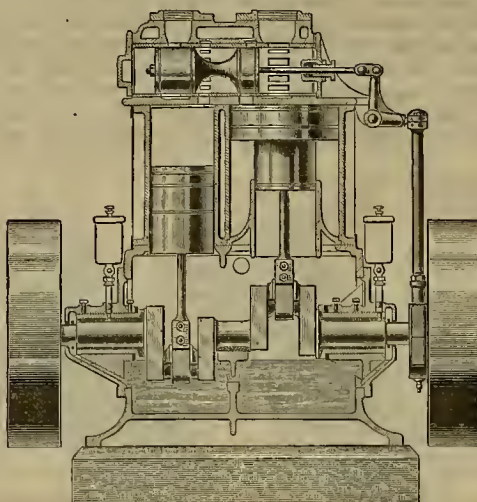
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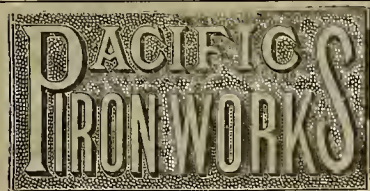
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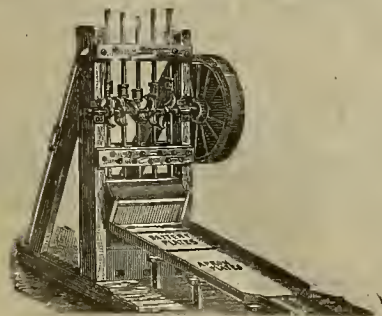
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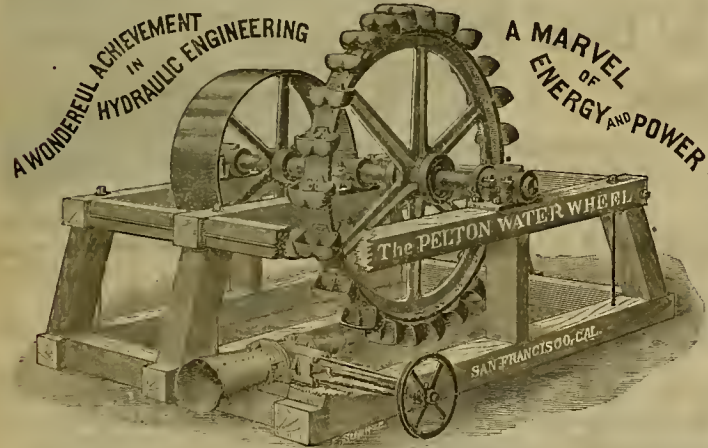
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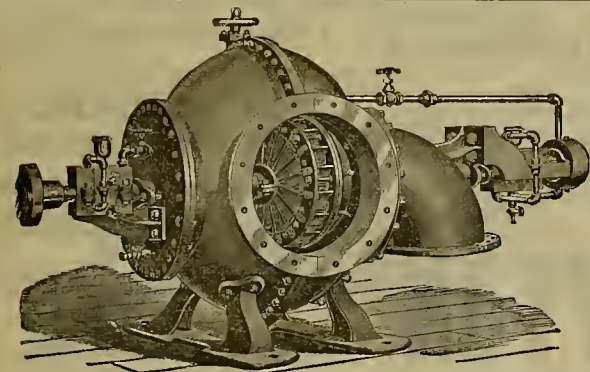
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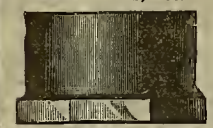
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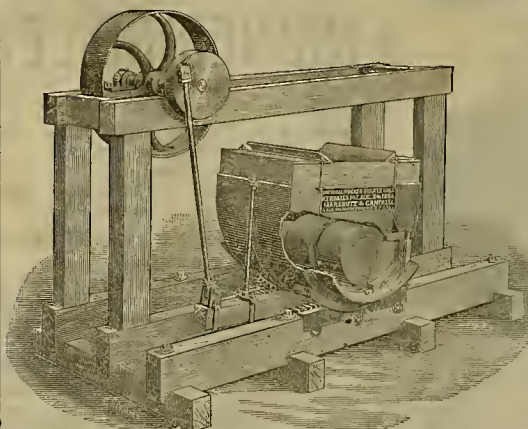
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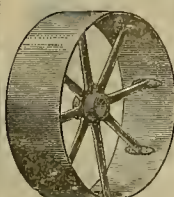
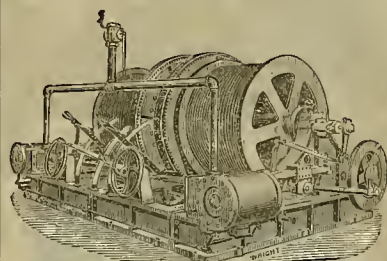
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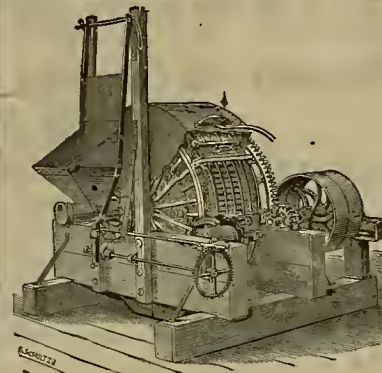
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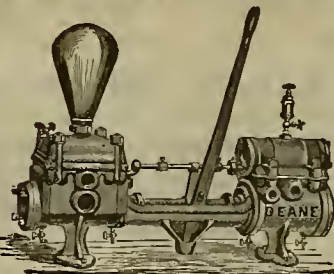
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Steam Engines, Saw Mills, Mining Machinery, Dredging Machines, Rock Crushers, Cable Railway Machinery, Ellithorp Air Brake Co.'s Patent Steam and Hydraulic Elevators, Air Cushions and Air Brakes. POSITIVE SAFETIES. Improved Ram Elevators, Sidewalk and Hand Hoists. B. E. Hennickson's Patent Automatic Safety Catches.

Machines of all kinds Made and Repaired.
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Manufacture Iron Castings and Machinery
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Mold-Board AMALGAMATORS,

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Of long experience, practical and administrative, in Copper, Silver and Gold Mining in Europe and America, offers services as Manager or Superintendent, or to search for and report on Mines. Now in Mexico. Several Languages. Address C. F., Box 2617, San Francisco, Cal.

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Mining and Hydraulic Engineer,

No. 307 Sanson St., SAN FRANCISCO.

ISRAEL W. KNOX,

Mining and Mechanical Engineer

AND PURCHASING AGENT FOR

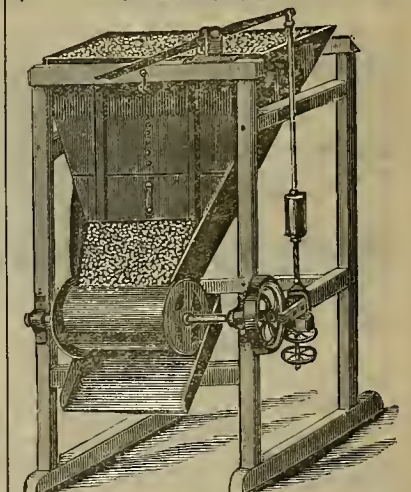
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THE ROLLER ORE FEEDER

(Patented May 23, 1882.)



This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.

In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar for repairs.

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"WITTER'S SPRINGS." 16 miles from Lakeport, 20 miles east of Ukiah. Comfortable Hotel. Quiet Cabins. Lovely Scenery. Low Charges. Its waters are a sure cure for Dropsy, Scrofulous and Skin Diseases; Rheumatism, etc. Address H. L. DENIO, Upper Lake.

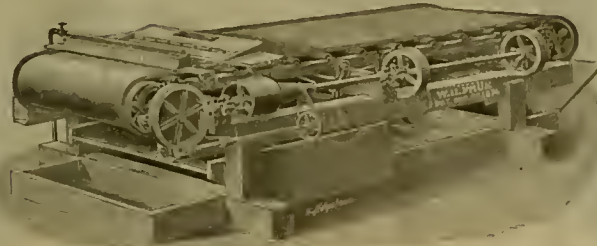
IMPROVED BELT FRUE ORE CONCENTRATOR.

The Best Ore Concentrator in the market, having double the Capacity and doing its work as close as the plain Belt machine, while its concentrations are clean. It is used in a number of Mills, the most notable of which is the Alaska M. & M. Co's Mill, where 24 Improved Belt Frues are taking the Pulp from 120 Stamps, crushing 350 tons per day, and is giving entire satisfaction as against 48 plain Belt Machines, taking the Pulp from the other 120 Stamps.

Price of Improved Belt Frue Vanner, \$900, f. o. b.
Price of Plain Belt Frue Vanner, \$575, f. o. b.

For Pamphlets, Testimonials and further information apply at office.

ADAMS & CARTER, Agents FRUE VANNING MACHINE CO., Room 15. No. 132 Market Street, San Francisco, Cal.



Protected by Patents December 22, 1874; September 2 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883; July 24, 1888. Patents applied for.

There are Over 2200 Plain Belt Machines now in Use.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.
DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly,
THE MONTANA COMPANY (Limited).

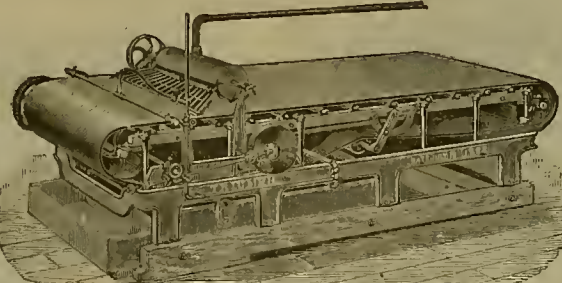
N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased.
ADAMS & CARTER.

"TRIUMPH" ORE CONCENTRATOR WITH IMPROVED RIFFLED BELT.

The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frue" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frue" Vanner is the best ore concentrator in the market. The fact that the "Frues" have improved (corrugated) belts does not militate against the superiority of the "Triumphs;" for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.

Price "Triumph" Concentrators, with Improved (Patented) Belt - - - \$650 f. o. b.
Price "Triumph" Concentrators, with Plain Belt - - - - - \$550 f. o. b.

We are prepared to guarantee the superiority of the "Triumph" over the "Frue" or any other form of Concentrator, for coin if need be. Circulars and testimonial letters furnished on application.



(PATENTED.)
Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

Original Empire Mill and Mining Company,
Principal Office, 401 California S., cor. Sansome, S. F.
Location of Works, Grass Valley, Nevada Co., Cal. }
GRASS VALLEY, NEVADA CO., CAL., Nov. 10, 1885.

Joshua Hendy Machine Works, 39 to 51 Fremont St., S. F., Cal.:

GENTLEMEN—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.

At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrators is the equal, if not superior to any other style of Vann or concentrating devices.
(Signed) DAVID MCKAY, JR.,
Supt North Star and Original Empire Mining Co

N. B. When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.

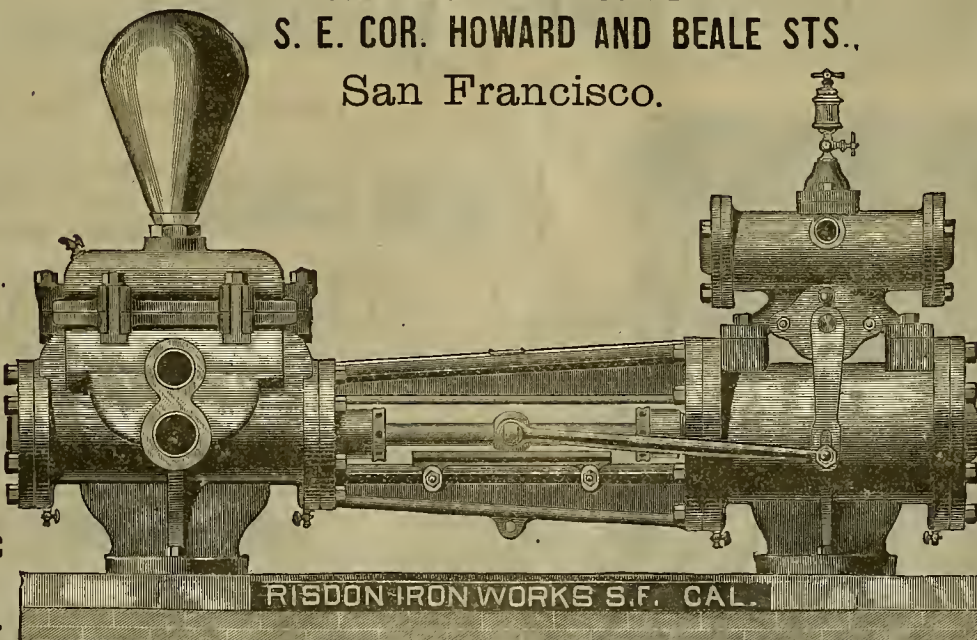
JOSHUA HENDY MACHINE WORKS,
39 to 51 Fremont Street, San Francisco, Cal.

DAVIDSON STEAM PUMPS.

Risdon Iron and Locomotive Works,

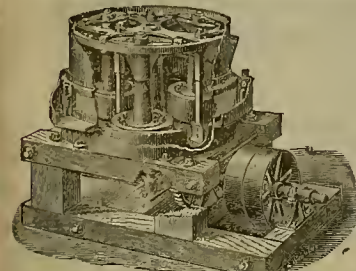
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Marine Pumps,
Wrecking Pumps,
Fire Pumps,
Brewery Pumps,
Mining Pumps,
Low Pressure Pumps,
Vertical Pumps,
Balanced Hydraulic
—AND—
Heavy Pressure Valve.



Sugar House Pumps,
Railroad Pumps,
Vacuum Pumps,
Air Pumps,
Circulating Pumps,
Tannery Pumps,
Hydraulic Pumps,
Elevator Pumps,
Independent Air Pump and Jet Condenser.
Artesian or Deep Well Pumps.

The Only Steam Pump Made that can be run at High Piston Speed without Shock and with Safety to the Machine. Piston Rods, Stuffing-Boxes, Valve Seats, Stems and Linings of Water Cylinders are of Best Composition Metal, U. S. Standard.
EVERY PUMP THOROUGHLY TESTED BEFORE LEAVING FACTORY.
Send for Catalogues.



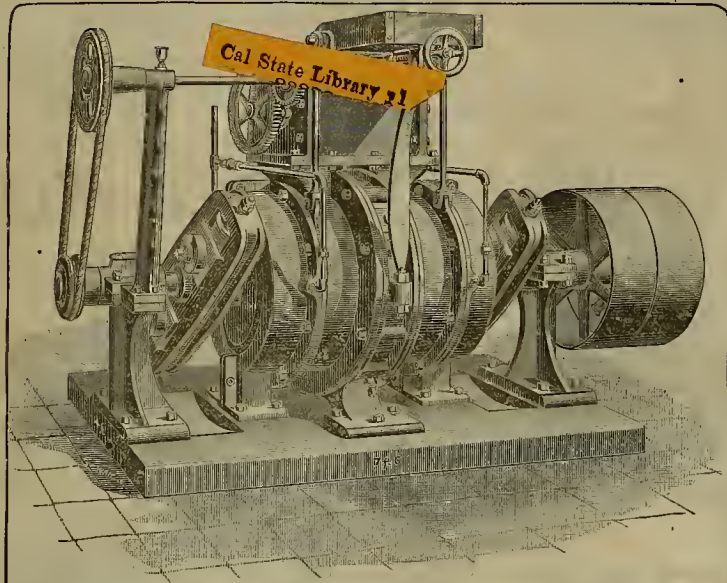
F. A. HUNTINGTON,
— MANUFACTURER OF —
CENTRIFUGAL ROLLER QUARTZ MILLS,
Concentrators and Ore Crushers,
Mining Machinery of Every Description. Steam Engines and Shingle Machines.

SEND FOR CIRCULAR.

Centrifugal Roller Quartz Mill. 213 FIRST STREET, SAN FRANCISCO, CAL

FRISBEE WET MILL.

This Mill, with a weight of less than 9000 pounds, has a capacity of three tons per hour of hard quartz to 40 mesh; has been thoroughly tested; we guarantee its work as represented, and we will give long time trial.



IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS

And renewals will not cost over one-half as much as for stamps. Will run empty, or with small amount of ore without injury. The attention of parties having Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh; 30 to 35 H. P.

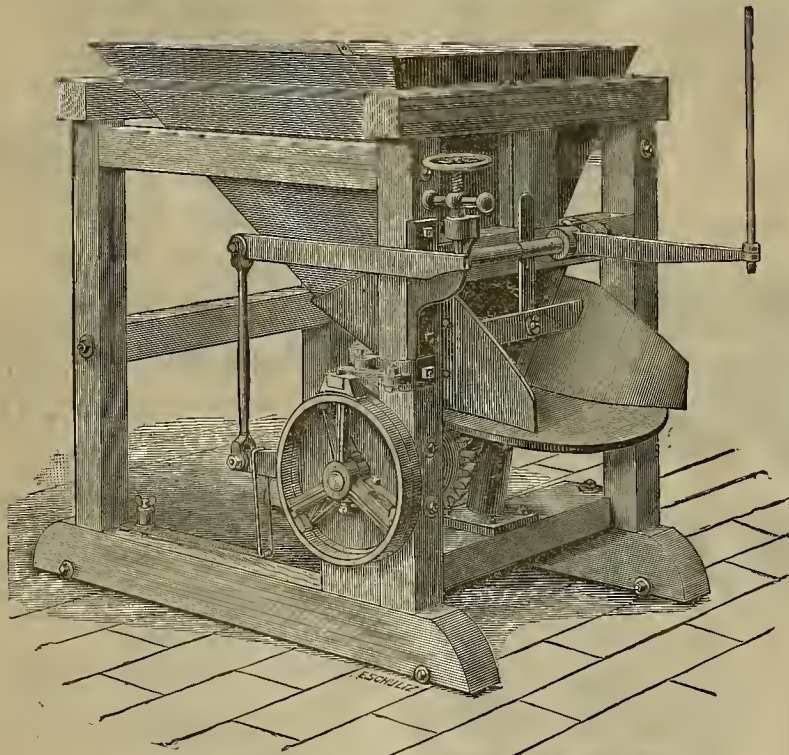
OUR DRY MILLS are the most economical ever built, and are extensively used with record of several years. No grinding in pans. Mill finishes to any fineness desired.

FRISBEE-LUCOP MILL COMPANY.

GIDEON FRISBEE, Manager, - - - 59 & 61 First Street, San Francisco
HOOKER & LAWRENCE, Gen'l Ag'ts, 145 Broadway, New York.

JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 FREMONT STREET, SAN FRANCISCO, CAL.



"HENDY" IMPROVED "CHALLENGE" ORE FEEDER.

The best form of Feeder ever devised, and pronounced by reputable mining men to be far superior to any form of "Roller" Feeder manufactured. We refer to the following gentlemen who have furnished us with testimonial letters to the above effect, which can be seen at our office, viz.:

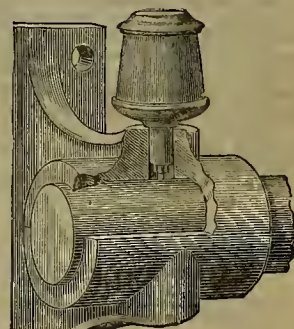
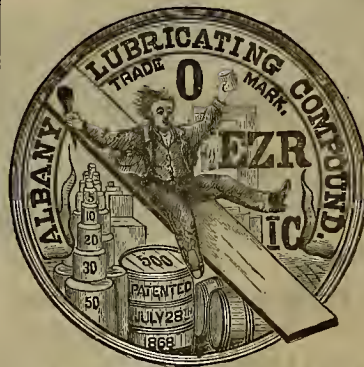
N. W. CROCKER, Supt. Bunker Hill Gold Mining Co., Amador City, Cal. D. C. WICKHAM, Taylor Mine, Greenwood, Cal.
J. R. TREGLOAN, Supt. South Spring Hill Gold Mining Co., Amador City, Cal.
W. G. ROBERTS, Greenwood, El Dorado Co., Cal.

WE ARE MANUFACTURERS OF THE

"CHALLENGE," "STANFORD," "TULLOCK," & "ROLLER" FEEDERS,

And will furnish descriptive Catalogues and quote prices upon application.

ALBANY Lubricating Compound and Cups.



1868.

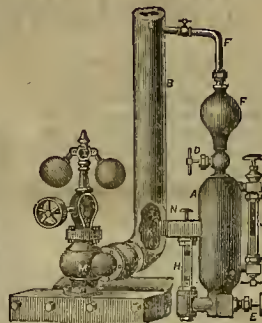
Manufacture commenced at Albany, New York.

1876.

Introduced by us on Pacific Coast.

1889.

Cheap imitations having had time to show that they are the most expensive in the end, the Sales of the Genuine Albany Compound are Larger than ever before.



England, Belgium,

France,

And other Foreign Countries are now Large Consumers.

We are also Sole Agents for the

Albany Cylinder Oils,

Albany Spindle Oils, Etc.

FOR SALE ONLY BY

TATUM & BOWEN,

Sole Agents for the Pacific Coast,

Dealers in Improved Woodworking Machinery,

Sawmill Machinery, Engines, Boilers, Ironworking Machinery, Supplies, Etc.

Sole Agents for Hoe Chisel-Tooth Saw, Gardner Governor, Schultz Leather Belting, Etc.

34 AND 36 FREMONT STREET, SAN FRANCISCO.

85 FRONT STREET, PORTLAND, OR.

VULCAN IRON WORKS,

135-145 Fremont St., San Francisco, Cal.

MINING MACHINERY { Stamp Batteries, Pans and Settlers,
"Dodge," and Improved Blake, Rock-Breakers,
"Dodge" Pulverizers, Slime Machines, etc.

AERIAL WIRE ROPEWAYS.

(VULCAN PATENT SYSTEM.)

The cheapest and most reliable form of Transportation of Ore, Coal, etc. Saves four-fifths of the cost by any other method.

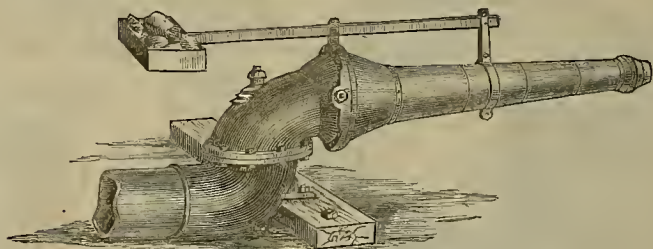
SAW-MILL REFRIGERATING CABLE-ROAD } **MACHINERY.** **STEAM ENGINES** { **CORLISS,**
Meyer Cut-off, Slide Valve.

SPECIAL MACHINERY TO ORDER.

SHAFTING,
PULLEYS,
BOXES,
HANGERS, etc.

REPAIR WORK SOLICITED.

IMPROVED FORM OF HYDRAULIC GIANTS.



THE ABOVE CUT ILLUSTRATES THE IMPROVED FORM OF DOUBLE-JOINTED HYDRAULIC GIANTS which we manufacture. We guarantee purchasers of this form of Giants against all costs, expenses or damages which may arise from any adverse suits or actions at law. We are further prepared to furnish Single-Jointed Giants when required. Prices, discounts and Catalogues of our specialties of Hydraulic Mining Machinery sent on application.

JOSHUA HENDY MACHINE WORKS, 39 to 51 Fremont St., San Francisco.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

ANNUAL MINING REVIEW—TWENTY PAGES.

VOL. LX.—Number 5.
DEWEY & CO., PUBLISHERS.

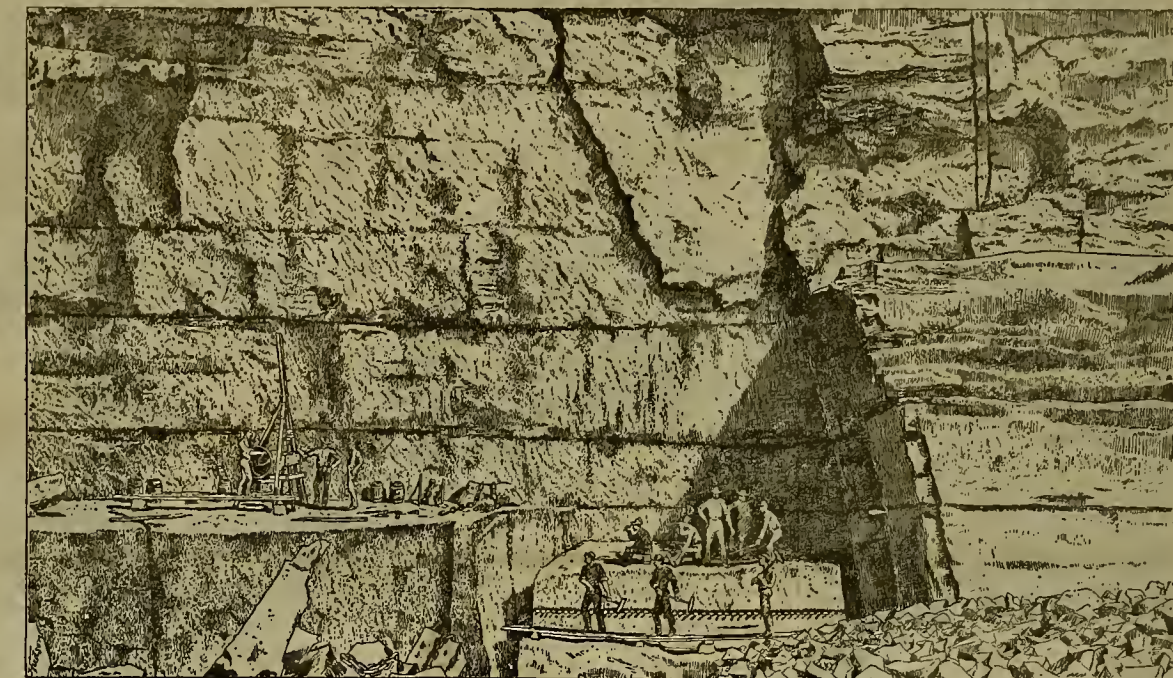
SAN FRANCISCO, SATURDAY, FEBRUARY 1, 1890.

Three Dollars per Annum.
Single Copies, 10 Cts.

A Modern Gold-Mill.

A cut on this page shows a modern 40-stamp gold-mill run by steam-power, such as are used all over California. The mill is usually built in such a situation that the ore can be delivered by car or wagon at the upper part where it is dumped against an inclined "grizzly," and the finer ore passing through the interstices of the grizzly, falls directly into the main ore-bin. The coarser ore (too large to pass through the grizzly) is screened off by gravity into the coarse ore-bin, from which it is drawn by gravity directly into the rock-breakers, or it falls upon a floor in front of the rock-breakers. By these it is crushed, and falls into the main ore-bins. From the main ore-bins the ore passes through gates into the "self-feeders," which supply it automatically to the batteries. Quicksilver is fed at intervals to the mortars of the battery, and coming in contact with the native or "free" gold of the finely crushed ore ("pulp"), forms with it an amalgam. This amalgam is caught partly by the copper plates in the battery, and partly upon the amalgamated or silver-plated copper plates, after it has issued through the screens of the mortars. The amalgam is "cleaned up" periodically and retorted. Retorting consists in the sublimation of the quicksilver, the vapors of which are condensed in water and the quicksilver collected. The residual gold is in a porous state. It is melted with fluxes in crucibles and cast in ingots. The mill shown in the engraving is from a design of the Union Iron Works in this city.

The pulp from which the free gold has been extracted by amalgamation passes over concentrators of various mechanical devices. These concentrators effect a separation of the auriferous sulphurets from the worthless gangue. In California the concentrated sulphurets are treated by the chlorination process. In some



METHOD OF QUARRYING OUT LARGE BLOCKS OF SANDSTONE.

other sections of the country the sulphurets are sold to smelting works. The gold ores of California carry on an average two per cent of sulphurets. The concentrated sulphurets assay on an average from \$60 to \$90 per ton in gold, with from a trace to several dollars in silver. The custom chlorination works of California charge \$20 per ton for the treatment of sulphurets, and return 90 per cent of the assay

value. Under conditions ordinarily favorable, a plant treating 6 to 9 tons per 24 hours can reduce the sulphurets at a cost of \$3 to \$10 per ton, extracting 90 to 94 per cent of the assay value of the gold.

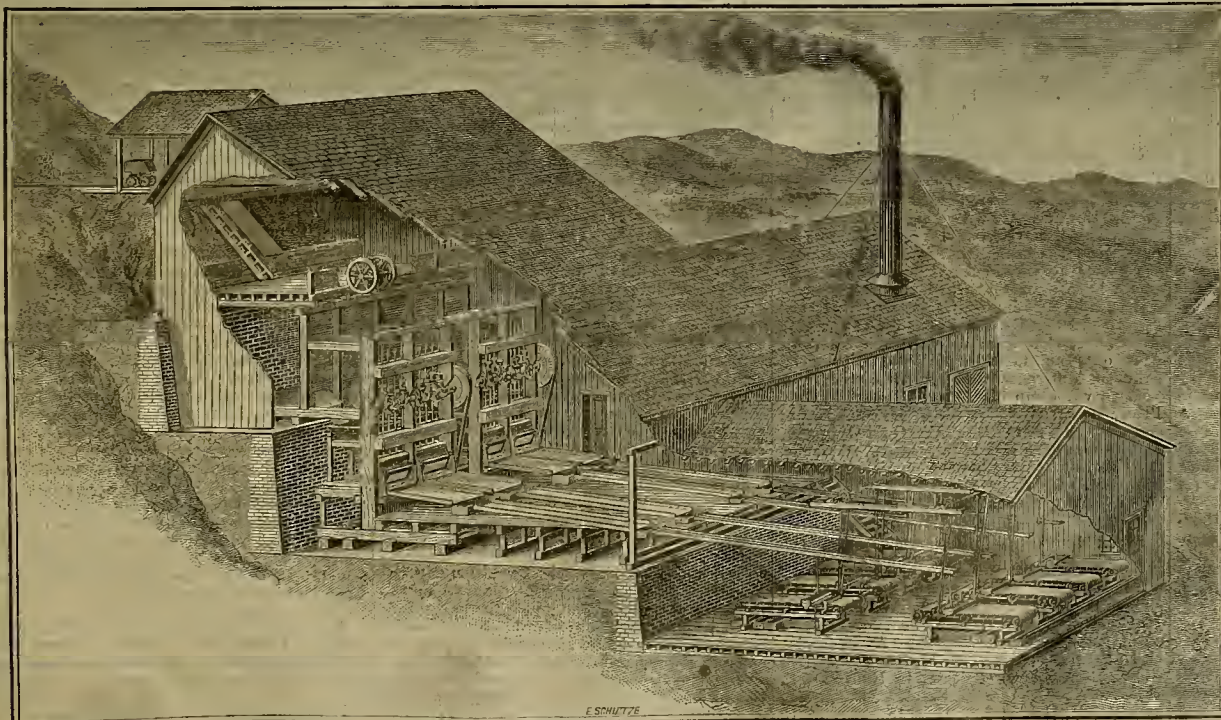
Sandstone.

Around the Bay of San Francisco there occur sandstones of a considerable variety of colors

which are beginning to come into use to some extent. The prevailing colors here are brownish and gray. On Angel Island there occurs a fine sandstone of a greenish-gray color, which was used in the Bank of California building; and others of a lighter shade are found in various parts of Alameda county. A few miles south of San Jose there are also inexhaustible supplies of light-gray and buff stone, but which are worked only in a small way. Near Cordelia, Solano county, there occurs a dark-gray, volcanic tufa that can perhaps be utilized for rough construction.

A very valuable handbook, by Geo. P. Merrill, curator of the Department of Geology at the Smithsonian Institute, has just been issued, being a description of the collection of building and ornamental stones in the U. S. National Museum. The book is not a dry catalogue, but is well written and interesting, giving as it does so much information concerning all sorts of building-stones.

Among other things is a description of the sandstone quarries at Portland, Conn., a cut of which is shown on this page. The stone is of medium fineness of texture, of a uniform reddish-brown color, and lies in nearly horizontal beds varying from a few inches to 20 feet in thickness. Natural blocks 100 by 50 by 20 feet occur, and hence blocks of any desired size can be obtained. The blocks are roughly trimmed down with picks at the quarry, and shipped thus to New York and other large cities to be worked up as occasion demands. Scarcely any of the material is dressed at the quarries. The stone has been used in all our leading cities, particularly in New York, and has even been shipped to San Francisco via Cape Horn.



A CALIFORNIA 40-STAMP GOLD-MILL WITH CONCENTRATORS.

Locked Up.

Gold in Nevada County's Gravel Channels.

It is only a mere matter of time, says the Nevada Transcript, when the National Government will wake up to the exigencies of the case and turn its attention to unlocking again the golden treasure-house of the gravel channels, which are known to contain to-day more gold than has ever yet been taken out of them—large as that sum has been. In order that the public may form some idea of the value of the gold known to exist in only one of the gravel channels in the county of Nevada, one need but look into the testimony taken in the Woodruff case from unimpeachable witnesses, backed up by facts such as could not be controverted, as to the yield of the one main channel which occupies the ridge between the Middle and South Yuba rivers. It has been from four to six millions of dollars in gold per mile.

There can be no doubt that the amount of gold remaining in the unworked ground of the North Bloomfield Gravel Mining Co. is at least \$10,000,000, perhaps more. Its deep tunnel, constructed at a cost of three-fourths of a million dollars, controls enough more ground along this channel, belonging to other parties, to turn out at least \$8,000,000 more. And it owns other ground which is partially opened which certainly contains \$4,000,000 more.

The Milton Mining and Water Co. owns of unworked ground on this channel enough to turn out at least \$10,000,000 more, besides claims (that can be worked through its tunnels) not belonging to it, in which there is at least \$10,000,000 more.

The Eureka Lake Co. owns of this channel enough to turn out at least \$20,000,000 more, thus making in the property owned and controlled by these three companies, not less than \$60,000,000 in gold. If to the property of these three companies he added the remainder of this known channel on the ridge, it will carry the total value of gold, in some 18 or 20 miles of this channel alone, up to nearly or quite \$100,000,000.

This value, as was stated in the evidence referred to by one of the witnesses thoroughly familiar with the subject, and indorsed by others, "is known not as a matter of conjecture but as a matter of certainty." All have a vague idea that the yield from the quartz mines has been in the past very large. But where \$1 has come from quartz mines, five or more have come from gravel. In fact the ariferous gravel channels, so-called, are the great storehouse of the gold deposits of the world.

This one hundred millions of treasure is now locked up by injunction, and while its extraction would keep thousands of workmen busy at large wages, and the product would stimulate all industries in our State, the country must sit down by its treasure-box, fold its arms and do nothing, because a few hundred acres of land in the great valley of the Sacramento is temporarily injured, and our wise judges say that none of our engineers are able to cope with so simple a problem as the construction of a dam to impound the dirt or debris which may come from mining out this gold, although there are engineers who have not hesitated to grapple with the problem of building an earth dam 170 feet in height, to impound water for the Spring Valley Water Works of San Francisco; to dam at Folsom a stream that during the winter months becomes a raging torrent; and in New York in connection with the Croton Water Works, to build a dam of stone 250 feet high.

This vast treasury has, in the past, been attacked by the three corporations named at a cost, for tunnels, water reservoirs and canals, of not less than \$6,000,000. But under the decrees of the courts, which have judicially determined that no dam can be built which will impound dirt and stones, these vast mines are idle, and the works connected with them fast going to decay. This is the case in one section of the State, covering some 20 miles only in length of this golden channel. If to it is added the hundreds of miles of similar deposits in other parts of the State, it is certainly within bounds to say that because a few acres of land in the Sacramento valley, of the value of about \$1,500,000, are temporarily injured by the past mining operations of nearly forty years, these hundreds of millions of dollars in gold which are known to be within these channels must remain locked up.

The result of the sage conclusion of these wise judges is that the slime of litigation and stupidity is gradually destroying and covering up all the extraordinary structures, built by the miners at enormous cost, requiring years in their construction, so deep that unless some relief can be had by legislation, they will soon be so buried and destroyed that they will never again be utilized, and the gold contained in these vast treasuries will remain there for all time.

The vast water reservoirs with the thousands of miles of deep tunnels will never again be reconstructed, if now allowed to fall into disuse and decay; and the gold will remain locked up where it is until wise counsels prevail.

THE CANAS MINING CONCESSION.—Mr. Fernando Beteta de la Pena returned Wednesday from a trip occupying 23 days to the Coconino country, 60 miles east by north of Alamo, where the mining territory recently conceded by the Government to Eugenio I. Canas is

located. Mr. Beteta has a hand on the property. He made a thorough examination of the territory embraced in the concession and found it to be very valuable both in placers and ledges, and is confident that it will prove to be a grand property. There is an abundance of water for all ordinary purposes, but not enough to carry on mining operations on a large scale, and Mr. Beteta will proceed to dig wells in the most favorable locations. He states that excellent water can be procured at from five to 20 feet below the surface and in large quantities. He also states that his company will probably begin active work on the property within 60 days.—Lower Californian.

Valuable Deposits.

Glass Sand, Coal and Porcelain Clay at Lincoln.

A. H. Gates, who lives near Lincoln, furnishes the Auburn Herald with the following particulars relative to the glass industry soon to be developed at that place. The tract in which the deposits named are found was recently sold by the Buckeye Mill Company of Marysville:

"Borings have been made this fall under his directions, on the property where the old coal mine is situated, for sand suitable for manufacturing glass. The anticipations of the projectors have more than been realized, as sand of the purest quality has been found in large quantities and at various places. This sand, it has been found, is in one distinct layer, and occupies one entire 40-acre tract. It lies at a depth of from 13 to 18 feet below the surface, and is from three to six feet in thickness. It is 95 per cent silica and is as clear, as Mr. Gates expresses, as the water of a mountain spring. The projectors have calculated that there is sand enough in this one layer to run a factory 100 years with an output of 20 tons of glass per day. Below this sand deposit is one of coal, which is from 8 to 10 feet in thickness. A pound of this coal has been found under a rigid test to yield four cubic feet of gas. The coal will be used to run the engine and the gas to melt the sand. Between the sand and the coal is a deposit of fine porcelain clay, which in some portions is three feet thick. The clay is of various shades of color, being pink in some places and dark gray in others. When burned it becomes pure white. Before this report reaches the readers of the Herald a company will have been formed with a capital of \$500,000. A factory will be erected on the land, and operations will begin at an early day. This means employment for a large number of hands, and will add greatly to the prosperity of Lincoln. The company intends to manufacture plate-glass exclusively, and will have a good thing though they charge the cost of transportation and the rate of duty only."

A GOLD MEDAL.—James D. Schuyler received notice yesterday morning that a gold medal had been awarded him, but his numerous friends were not engaged in congratulating him during the day. In fact, they did not know anything about it, for the modesty of the member of the Board of Public Works kept him from informing his friends of the distinction which had been conferred upon him. A Union reporter, however, unearthed the facts, and found that Mr. Schuyler, who is a member of the American Society of Civil Engineers, has been awarded what is known as the Normal Gold Medal, it being the first prize for a paper read by Mr. Schuyler before the annual convention of the society October 17, 1888. The paper, which has been published in pamphlet form and illustrated, is entitled "The Construction of the Sweetwater Dam." The last meeting of the society, at which the above-mentioned medal was awarded to Mr. Schuyler, has just been held in New Haven, Conn.—San Diego Union.

HONDURAS MINES.—The Honduras Gold Placer Mining Company has executed a lease of their five-mile concession on the Guayape river to the Honduras Gold Company. The agreement dates from October 1st last. By this arrangement it is stated that the same amount of gold will be taken out of the one claim that would have been taken out of two separate claims, thus effecting the saving of the cost of turning the additional claim, and also avoiding any trouble that might have arisen from the labor question, tailings, backwater, or other points of difference that sometimes arise between rival companies. The Honduras Gold Placer Mining Company will receive one-half of the net profits of the Honduras Gold Company, besides acquiring a half-interest in the extra 2000 varas that have been turned over to that company, and their directors have also an equal voice in the control of the finances.

STOCK EXCHANGE COMMITTEES.—The following committees have been appointed by the president of the San Francisco Stock and Exchange Board: Executive—A. W. Foster, J. H. Crocker, George I. Ives, Thomas Whetstone and George W. Cope. Finance—A. F. Coffin, C. E. Paxton and Geo. W. Kelly. Stock List—Jos. Marks, A. G. Garnett, H. H. Noble, E. P. Murphy and Werner Stauff. Commission and Rules—Coll. Deane, H. H. Shinn and E. Epstein.

Utah's Metal Product for 1889.

Wells, Fargo & Co.'s Statement of the Mineral Product of Utah for 1889.

	Lbs. of Copper.	Lbs. of Lead.	Lbs. of Silver.	Oz. Silver in Bars.	Oz. Silver in Bullion and Ores.	Oz. Gold in Bullion and Ores.	Oz. Gold in Bars.
Germania Lead Works	141,767	2,359,540	4,761,686		372,875	4,365	
Hannau Smelter			9,260,000		562,650	6,250	
Mingo Furnace Co.	538,810		11,278,690		692,517	6,107	
Daly Mining Co.			2,124,841	764,357	430,770	712	
Ontario Silver Mining Co.			2,004,280	972,442	989,622	1,614	
Silver Reef District.				134,407			
Other Mines and Placers.				6,200			
Net Product Bars and Base Bullion	630,577	2,359,540	30,029,497	1,877,406	3,048,434	739	10,051
Contents Ore Shipped			25,380,048		2,103,111		4,846
Contents Copper Ore Bullion and Matte Shipped	1,350,415		1,012,185		118,705		339
Totals	2,060,792	2,359,540	59,421,730	1,877,406	5,270,250	710	24,230

RECAPITULATION.

2,060,792 lbs. Copper, at 10 cents per lb.	\$ 206,079 20
2,359,540 lbs. Refined Lead at \$30.00 cents per lb.	89,662 82
59,421,730 lbs. Unrefined Lead at \$48.40 per ton	1,378,584 13
7,147,651 ozs. Fine Silver at \$9.93 per oz.	6,016,251 65
24,975 ozs. Fine Gold at \$20 per oz.	499,500 00
Total Export Value.	\$8,840,080 50

Computing the Gold and Silver at their mint valuation and other metals at their value at the seaboard, it would increase the value of the product to \$12,352,414.53

Comparative Statement, showing the quantity of Silver and Gold contained in base bullion and ores produced in Utah:

YEAR.	Total Ounces of Silver Produced.	Total Ounces of Gold Produced.	Ounces of Silver in Ores and Base Bullion.	Ounces of Gold in Ores and Base Bullion.	Per Cent of Total Silver Product.	Per Cent of Total Gold Product.
1880	3,783,566	8,020	1,403,819	2,878	37.1-10	35.8-10
1881	5,400,141	7,968	2,648,399	2,622	48.9-10	32.9-10
1882	5,435,444	9,039	2,581,789	5,016	47.3-10	55.5-10
1883	4,581,763	9,091	2,351,190	5,597	51.8-10	80.
1884	5,660,488	5,530	3,253,084	3,806	57.4-10	68.8-10
1885	5,972,089	3,003	3,189,576	7,250	53.4-10	81.8-10
1886	6,018,842	10,677	2,835,283	8,300	47.0-10	70.1-10
1887	6,161,737	11,387	4,049,273	10,714	65.7-10	94.
1888	6,178,855	13,886	3,082,217	12,854	50.4-10	92.5-10
1889	7,147,651	24,975	5,270,250	24,230	73.7-10	97.

Comparative Statement of the value of lead bullion, including silver and gold necessarily produced in its manufacture west of the Missouri River, compiled from the annual reports issued by John J. Valentine, Vice-President and General Manager, Wells, Fargo & Co., San Francisco.

YEAR.	Total Value of Precious Metals, including Lead.	Total Value of Lead Bullion, including Gold and Silver Contents.	Per Cent of Entire Product.
1881	\$84,504,417	\$30,253,430	35.8-10
1882	92,411,835	35,708,750	37.1-10
1883	90,313,612	34,810,022	38.5-10
1884	84,075,054	31,101,250	36.7-10
1885	90,131,200	35,731,711	39.6-10
1886	103,011,761	44,635,655	43.3-10
1887	104,045,059	41,595,853	39.7-10
1888	114,341,502	38,004,826	33.2-10

The metals, lead, silver and gold are obtained in almost all the productive mines located in this inter-mountain region. The ores are mostly low grade, and the assimilation of the metals causes the process of smelting to be the favorite and most economical method of reduction. This fact will explain the increase in the percentage of gold and silver produced in the manufacture of base bullion. It demonstrates conclusively, that any legislation, having for its object the repeal of the present tariff on lead, or the placing of the product of lead or lead ores on the free list, must diminish its production, and decrease in the same ratio the gold and silver product of the United States. This injury to our great mining industry is augmented by the action of the Treasury Department in admitting foreign ores (notably from Mexico) free of duty under a strained and doubtful interpretation of the present laws.

Stewart's Mining Bill.

A correspondent of the Georgetown (El Dorado county) Gazette says:

We have before us a copy of what is termed Stewart's Mining Bill—"to amend Chap. Six of the U. S. Revised Statutes, relating to mineral lands and mining resources."

After an experience in various kinds and methods of mining since 1849, and the practical workings of the different laws and regulations which have from time to time been adopted, I submit the following in reference to the proposed bill:

That portion of Section 2324, R. S., to be amended so far as relates to change of time, viz.: "The year within which the annual labor or improvements required to be performed or made by this section shall commence at 12 o'clock meridian, on the 1st day of October of each year"—and further on in said section, "In case the first day of October falls on Sunday, or any holiday, the following secular day shall be construed as the first day of October within the meaning of this Act"—no doubt would prove of real benefit, and correct some of the looseness and misunderstanding of the present law.

That portion of the proposed bill making distinction between placer and lode claims—the term placer embracing surface, drift and seam diggings, lode that of quartz only; surface and drift merge into each other, seams and lode into quartz—that only \$25 worth of labor should be required to be performed on the former (placer) and \$100 worth of labor on the latter (quartz), seems hardly just, as these claims embrace the same areas, 20 acres each, and the same surroundings according to location. Either assess the required labor to be performed on each at \$25 or \$100. The amount really makes little or no difference, but should be equal. The remaining portion of the bill is only ingenious tinkering or paraphrasing of the present law. With the change above noted, the present law answers all practical purposes, and no further amendments ought to pass.

It is difficult to those who have been engaged in mining these many years to understand the necessity of putting the mining interest into strait-jackets or being corralled by bar-wire surroundings, which is not applied to other occupants of the public domain.

The wise and early course pursued by the Government in allowing the miner the free use of the mineral lands for exploration should relieve him from being considered a highway

robber, to be pursued year after year by ignorant legislators or bribed officials.

If any legislation is necessary to advance the mining industry, it is in the direction of restricting the action of railroads within railroad grants by setting up their false and fraudulent claims to lands known to be mineral, and their persistent attempt to secure the same by exhausting the energies and means of those engaged in the occupation of mining. Their influence with the local land officers seems omnipotent.

NEVADA'S SALT MOUNTAINS.—The salt mountains located on the banks of the Rio Virgin, an affluent of the Colorado river in Lincoln county, Nev., cover an area of 25 miles, extending to within seven miles of the junction of that stream with the Colorado. The salt they contain is pure and white and clearer than glass, and it is said that a piece seven or eight inches thick is sometimes clear enough to see through to read a newspaper. Over the salt is a layer of sandstone from two to eight feet thick, and when this is torn away the salt appears like a huge snowdrift. How deep it is has not yet been ascertained, but a single blast of giant powder will blow out tons of it. Under the cap-rock have been discovered charred wood and charcoal, and matting made of cedar bark, which the salt has preserved, evidently the camp of prehistoric man.

THE Elkhorn Mining Co., Jefferson county, Mont., was organized in 1883, and the dividends paid out during the last year amounted to \$180,000. The property has just been sold to the Mining and Financial Trust Syndicate (limited), London, for \$560,000. The property embraced in the inventory of purchase includes 90 acres of ground, a well-equipped mill, good machine-shop, hoist and all the supplies and stores on hand.

SILVER DISCOUNT.—The discount on silver bullion reduced the coin value of the December yield of the Hale and Norcross mine \$12,000. The discount on the yield of the Con. Cal. and Va. for that month was \$42,450. The discount on the entire December yield of the lode footed up \$102,000—more than one-sixth of the amount of the total product.

A TACOMA DISPATCH says at least ten human beings and thousands of cattle and sheep have perished in the lizards which have raged over the State of Washington since the first of the year. Reports from Colville reservation are that cattle are dying by hundreds from starvation and thirst.

Snow-Shoeing in the Sierra.

The continued stormy weather in the mountainous portions of California has brought snow-shoes into prominence, since they are now being used in so many places by men to pack in supplies where the roads are blocked. The snow-shoes used here are very different from those in use in Canada. Snow-shoes for traveling in California are from 8 to 12 feet long, $3\frac{1}{2}$ to 4 inches wide, and $1\frac{1}{4}$ inches thick in the center. They are tapered at the top from the center to one-fourth of an inch in thickness at the toes, and nearly flat. The toes are turned up like sleigh-runners. They are nearly of uniform width from end to end—a little wider, if any, on the front—and a spring is worked in so that without weights they rest on the heels and points; but when the rider stands on them the weight is somewhat evenly distributed and a concave groove is made at the bottom, beginning near the toes and running to the heels, similar to the bottom of the skates. The bottoms are highly polished and tar is turned and rubbed in until a

or no spring being required on the back part—the most essential being the front. The object of this is that in running over rough places there will be no sudden jerk, endangering the equilibrium of the rider, who often attains a speed of 60 to 80 miles an hour on these shoes. They have a tendency to "hook" when going over uneven snow, and the rider often finds that they are as uncertain as all other things are here below.

The rider stands a little back of the center, his feet being held by toe-straps of strong sole leather or india-rubber belting, fastened to either side of the shoe, and laced where they meet over the foot. The toe of the foot is put into the straps back to the ball, and in the hollow of the foot there is a small block inserted crosswise to prevent the foot slipping back; but this does not prevent the foot, when the heel is raised, from being slipped out of the straps. The bottom of the shoe resembles a skate with a groove, but instead of being convex, it is concave. This is necessary to balance the weight of the rider as equally as possible from end to end. They are constructed on the principle of skates, and to some extent the same evolutions are practicable, such as allowing the points and

temperature, up to the frozen, when a hard dope is required. The manufacturer requires considerable skill and ingenuity. A great deal depends upon the boiling of the dope; some requires but a light simmer, enough to melt the parts together, while another requires a good deal of boiling—gum, beeswax, rosin, sperm candle, and some other materials make an inferior quality of dope, only used for traveling purposes, but modern "lightning dope" is manufactured from spermaceti, Burgundy pitch, Canada pitch, balsam of fir, spruce, cedar, Venice turpentine, oil of cedar, pine, hemlock, fir, spruce and tar, glycerine, Barbary tallow, camphor, and castor oil, and many costly drugs known only to those who make it a specialty and its manufacture a secret. Oil, grease, and such material, one might naturally suppose would cause a shoe to slip easily over the snow; varnish or any other polished material is useless, nothing but the scientific preparation will do. It may seem that a "snow-shoelist," who enters the arena for a hard contested race, to meet all the changes of snow, must have a commissary and necessary varieties of dope, for it is a common saying among snow-shoers that "Dope is King."

strange gyratory motion in the air, a thing not uncommon with beginners upon these quick and uncertain carriers.

The racing track, clear of trees, shrubs and other obstructions covered with many feet of snow, the more the better, is chosen on steep side hills and is about 1000 to 2000 feet long with angle of depression of 15° to 35° being always in a direct line and as even as possible. The winning poles are set on the lower end, on comparatively even ground, in order to give the racers a chance to brake up, after passing through; which is done by dragging their poles behind the shoes and bearing heavily on them in a sitting posture.

Great steadiness is required in riding, and very perfect control over the shoes; but still with all, the best riders sometimes plow the snow and hound in the air at a fearful rate. Serious injury is seldom sustained from falling. The greatest danger lies in other riders coming in contact with one falling.

The mills of the California Hosiery Co. at Oakland have been closed down. Secretary Williams stated that the general depression of the woolen market was the principal cause of



SNOW-SHOE RACING IN THE SIERRAS.

full, mahogany-like finish is obtained, which hardens the wood, makes a smooth surface, and attracts heat when exposed to the sun—the latter being a desideratum in putting on the "dope" when traveling.

A good many years ago we had in the PRESS a description of snow-shoeing in the Sierra, written for us by C. W. Hendel, the well-known deputy mineral surveyor of Sierra and Plumas counties. With this was a sketch which we here reproduce as appropriate to the times and the season, showing a snow-shoe race in the mountains of California.

Shoes made for racing are from $10\frac{1}{2}$ to $13\frac{1}{2}$ feet in length, from $3\frac{1}{2}$ to $4\frac{1}{2}$ inches in width, wider on the front part than on the back. Where the turn commences to the heel, or back end of the shoe, there is a fluted or concave groove about $\frac{3}{8}$ of an inch deep at the heel and tapering in depth from the turn at the point. This groove is about $1\frac{1}{2}$ inches wide, narrower at back end than in front. On top of the shoes, a little back from the center, there is about 18 inches of wood left flat, and toward the front they are shaved and planed, tapering sufficiently to leave the point springy. There is considerable wood left behind from the center to the end, which makes the proper balance—little

curves to describe a circle. Of course they cannot be turned so easily or quickly as skates, but still they are easily managed by experts.

The *sine qua non* of snow-shoe racing is "dope." This is the material used to lubricate the bottom of the shoes and cause them to glide swiftly over the snow, as an axle is lubricated, to cause the wheel to revolve easily, the object being to counteract friction as near as practicable. To such a perfection has the manufacture of this article attained that friction has to a great extent been overcome.

The temperature of the snow is as variable as that of the atmosphere, and for every temperature of snow a different kind of dope is required. Every racer has at least half a dozen recipes for compounding the "dope," sometimes termed "greased lightning"—one for cold snow and one for warm (?) or damp snow, as it is called by experts, as when the snow is heated by the rays of the sun; one for dry snow and one for wet, one for hard and one for soft; one for forenoon and one for afternoon; for extreme cold or frozen snow; and for new dry snow there is still another kind required. Some go so far as to have a different kind for every hour of the day. For moist snow the dope is soft, and is made harder for increase of

The dope, in order to be good, must possess two qualities: First, it must be sticky so that it will adhere to the shoe. Second, slippery, so that it will glide over the snow. And, strange as it may seem, they have attained such a degree of perfection in making this compound that a snow-shoe prepared with it and placed by the side of one with the bottom finished with polished steel, would so far outrun it as to make it no race at all. In riding for the first time down a steep hill on shoes so prepared, the great requisite is confidence. Timidity is fatal, and for one, on starting down a hill, to be afraid of falling, will never do; he might with as much success try to stem the current of the Niagara river as to keep from falling when he thinks he may, or has not confidence in himself. In racing, it is advisable to ride very low upon the shoes, in what is called the "squatting" position, and to hold the pole in the right hand, and in going over any obstruction, occasioned at times by a tree lying across the track under the snow, or by the wind drifting and forming a depression and elevation, which will, when a snow-shoelist is going down very fast, make a considerable lift; both shoes and rider, and sometimes the shoes go on their course alone, while the rider is making a

the company's going out of business, as it was considered better to round up the affairs of the concern than to run it without prospect. The company is solvent. The entire woolen market has been at a standstill for several years, and that the directors decided not to wait until times improve.

AMERICAN COKE AND COAL IN EUROPE.—The Reading Railroad Co. is reported to be perfecting plans for exporting anthracite coal to European markets. Samples have been prepared and will be shipped to Antwerp. The high cost of this coal laid down on the continent, it is admitted, will prevent any but the wealthier classes from becoming consumers of it. The price, it is said, will range from \$8 to \$10 per ton. Similar action is reported to be contemplated by large coke operators who, it is said, anticipate developing some trade in this product with English iron manufacturers.

WHAT IS LATENT HEAT?—The following very good definition is given by a cotemporary: "Latent heat is the quantity of heat which must be communicated to a body in one state in order to convert it into another state without changing its temperature."

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

[The snow blockade on the railroad lines has prevented the receipt of exchanges from Oregon, Washington, Idaho, Montana, Utah and parts of Nevada and California, so that we are again this week, as last, unable to give our usual quantity of current mining news.—EDS. PRESS.]

CALIFORNIA.

Amador.

SUTTER CREEK.—Cor. Amador *Ledger*, Jan. 25: Work at the Lincoln is to take a more extensive range. Mr. Stewart, satisfied of the existence of another ledge, parallel with the one now being operated, has let a contract to sink 50 feet to test the quality of the ore, which from prospects taken from the surface will reach a paying standard. The mill has come to a temporary standstill to await more favorable weather. W. Body, an expert in the management of concentrators, has arrived from Nevada, and is engaged for a short time to overhaul the Wildman concentrators. The North Star is running along in its usual groove. They are working at the 600 level, but in all probability they will conclude to return to the 800 level again before long, as it is known by all good miners that the ore chimneys pitch south, and as they are a considerable distance south of the South Spring Hill mine, the ledge may be found at the 800 or 1000-foot level.

AMADOR.—Cor. *Ledger*, Jan. 25: The Keystone mine and mill have shut down in consequence of the large amount of water entering the mine this winter. A steam pump in the north shaft is unable to cope with it. Prospecting is still continued in the 1400-foot level. They are also short of wood, teams being unable to travel over the roads. The Gower mine has suspended operations, the supply of powder having run short, and there is no way at present of getting it from Ione. The electric lights are again lighting the South Spring Hill, adding much to the appearance of this well-regulated mill; the stamps are dropping as regularly as ever.

KEYSTONE.—Amador *Ledger*, Jan. 25: All the men employed at this mine in extracting rock were laid off on Monday morning, owing to the impracticability of keeping the mill going, and at the same time control the largely increased flow of water incident to the incessant rains. About eight men will be kept at work underground in prospecting operations.

GARDINER.—The tunnel which is being run on this property has reached a distance of over 700 feet. Seven months have elapsed since Robert Stevenson bonded the property and entered upon the work of its development. Under the energetic management of James Gleason, 1000 feet of tunnels and drifts have been run. One ledge, 10 feet wide, known as the Paugh ledge, was cut some time ago. A few days back another quartz body was tapped by breaking into the side of the tunnel, the thickness of which has not been ascertained. A sample of the rock from this ledge was shown us this week. It is different from the general character of the quartz on the mother lode, but yields a very good prospect. The tunnel is now about 100 feet from the Union ledge—its objective point. All the hands were temporarily laid off Monday, owing to the heavy snowfall. There is talk of putting up a mill on the mine the coming summer.

HARDENBURGH.—Work at the Hardenburgh mine has been suspended temporarily, owing to the impossibility of getting material for the erection of the hoisting works. The shaft has been re timbered down to a point where the timbers were found to be sound. This is all that can be done until timbers for the hoist are received. All work has been suspended at the North Gower mine until the weather becomes more favorable. The Bunker Hill keeps its 40-stamp mill working steadily, and is said to be running satisfactorily.

The Amador gold mine continues to run its tramway over the Doyle ground, notwithstanding the injunction suit which has been commenced. A large force is at work under George Durham grading for the track. Owing to the late severe storms the 10-stamp mill of the Sutter Creek mine has been shut down. On the tunnel level the water is over the track. They expect to resume milling operations in a few days.

Calaveras.

WEST POINT.—Cor. Calaveras *Chronicle*, Jan. 25: Messrs. Brown & Hurley started their 20-stamp mill last Monday morning. They have an abundance of rock on their dump and we hope to see them make a good cleanup. It is reported that Mr. Moore has found some very rich rock in the new shaft south of the Blazing Star. They are now taking out some very rich rock at the Blazing Star. Mr. Moore has a large amount of ore on the dump ready for shipment as soon as the weather and roads will permit.

COPPERPOLIS.—Cor. San Andreas *Prospector*, Jan. 25: As soon as the weather permits, an entire renovation of the Union mine office and chambers of the superintendent will be made. Several new rooms will be added and porches will be built over the front and sides. Five hundred cords of wood will be cut and stacked for the future use of the mine. The leaching process is going on and so is mining for ore. The large smelter will soon be in operation, and a large force of men will be employed.

El Dorado.

BLACK SAND.—An important discovery has recently been made in the matter of tailings, or black sand from cement gravel, now being worked by different processes of reduction. This gravel, as found in the old river channels, is too hard to be worked by ordinary sluicing and therefore, in order to obtain the gold contained in it, it must be reduced by machinery. Not long ago, Mr. Louis Landecker, principal owner of the Chili Ravine mine and mill, concluded that gold might be escaping, and to test the matter took several pounds of tailings to Mr. Montgomery, a practical assayer of this city, who obtained gold from the sample at the rate of over \$600 per ton of gravel. Not being fully satisfied, Mr. Landecker sent a sample of the same material

to Thos. Price & Son, assayers of San Francisco, whose returns showed about the same result, giving over \$600 per ton. The mill has ten stamps, and crushes about 60 tons of cement gravel per day. Mr. Landecker is now improving means by which to remedy this great loss of gold. Dr. W. W. Stone had a test made from the tailings at the Gignac mine, where a Bryan roller-mill has been running on the same kind of cement gravel that is found in the Chili Ravine mine, and obtained gold at the rate of \$250 per ton from the gravel. The tailings at the Chili Ravine mill seemed to be more than double the value of the material at the Gignac mine. Whether the difference is caused by the mills, or in the richness of the material worked, is a question; in either event the loss is more than the mining interest can bear, and it is hoped that experiments now being made may stop this enormous loss.

Nevada.

NO DAMAGE TO THE BRUNSWICK.—Grass Valley *Union*, Jan. 22: The report that some of the works of the Brunswick Mining Co. had been crushed by the snow proved to be incorrect. Only a shed was broken down, which was of small value.

ANOTHER MILL CRUSHED.—*Transcript*, Jan. 25: The Baltic Co.'s mill at the Gambrius mine on Poorman's creek, Eureka township, has been crushed flat by the snow. It has been unused for some time.

THE HYDRAULIC ITEM.—Grass Valley *Union*, Jan. 25: The Nevada *Herald* published an item a few days ago that information had been received by snow-shoe line that the large hydraulic mines in the upper portion of the county were running at full head, as the snow blockade made it impossible for the anti-slickens spies to get into the country and obtain any knowledge of the work. Everybody up this way understood that the item was but a joke, but it has been taken somewhat seriously down below and the officers of the North Bloomfield, Omega, Eureka Lake and Milton Mining Companies, at San Francisco, have felt called upon to send a letter to the press denying that there was any truth in the report. This was scarcely necessary, as it must be evident to any one who has heard of the snowstorms that have been prevailing in the mountains for several weeks that it was a physical impossibility to carry on hydraulic mining, even if there was a disposition to do so.

SOME WATER FOR THE MINES.—Grass Valley *Union*, Jan. 29: On Monday the ditch-tender reported that about 150 inches of water was coming into the large reservoir of the South Yuba Company near Banner hill, which was furnished by Little Deer creek. From this supply the Pittsburg mine expected to start its pumps yesterday, and in a few days more, when the connecting ditch is cleaned out, the North Banner mine will receive a supply from the same source. The pumps of both mines have been stopped for a week or more and the water has been rising in the lower levels. Superintendent Skewes says the North Banner can be pumped out in two weeks when they can get water-power again. There is no expectation that the main line of the South Yuba canal can be opened in less than 10 days or two weeks, with favorable weather, as there is a great depth of snow on a portion of the line, and the snow will have to be shoveled out of the canal. In the meanwhile the supply of water obtained from Little Deer creek will be of some use to the mines of the district, in aiding the pumps, and saving fuel, which is scarce and difficult to obtain. All of the mines that were compelled to use steam to keep the pumps going, have but a scant supply of wood.

Placer.

SUCCESSFUL ENGINEERING WORK.—Placer *Herald*, Jan. 22: Connection has been made between the new and the old works at the Mayflower mine, and the work proved to be a great success. The survey came out right to a dot and the water in the old works was tapped without the least trouble. The surveys have all been made by Ross E. Browne, and from the beginning have proved correct in the nicest particulars. His work included three very close calculations. First, there was the connection in the new tunnel between its mouth and its shaft; second, the tapping of the channel, and last, the connection with the old works just accomplished.

San Bernardino.

TEMESCAL TIN.—Chino *Champion*, Jan. 25: There is little if any doubt but that the famous Temescal tin mine will be practically worked soon. Mr. Robinson, a large owner in it, was recently reported on his way from England, whither he went on a cable dispatch from the intending purchaser. The English expert who examined the property for his clients made a very favorable report—more favorable than the owners of the mine expected. With pottery, rock, cement and coal at South Riverside, coal and pottery at Elsinore, and a producing tin mine between, a railroad through Temescal canyon will be a necessary and a paying property.

OIL AT PUENTE.—San Bernardino *Times-Index*, Jan. 25: There are 14 wells being worked at Puente, of an average depth of 1000 feet. They are situated high up the sides of a small canyon which winds through the bosom of the hills, and from them the oil is forced to two immense tanks at the summit of the range; from this height it is piped by force of gravity to a reservoir at a siding of the Southern Pacific Railroad seven miles distant and about a mile from Puente Station. The economic advantages which characterize the situation and control the working of the enterprise are remarkable, and they greatly enhance the value of the property. For instance, the pumps are worked by 13 steam engines, the steam for all these being supplied by two boilers—those at wells 1 and 9—the steam being piped from them to all the engines. The only fuel being required by the two furnaces is natural gas piped from the crossing of the wells, supplemented with less than a barrel of the crude oil every 24 hours. The heavy cost of wood or coal and the expense of transportation and handling that would attend their use as fuel is wholly saved.

IRON.—San Diego *Union*, Jan. 23: There is good authority for stating that the two noted iron mines in San Bernardino county, known as the Iron Chief and the Granada, have changed ownership. From the relation the purchasers bear to the great San Luis Rey water enterprise, it is presumable that the mines were bought for the purpose of manufacturing iron and steel water-pipe to be used in distributing the water of this great system. In

this view the fact is quite significant, not only as showing the far-reaching purposes of the men connected with the enterprise, but also as pointing to the development of iron mines and manufactures as an outgrowth of the water enterprise. These iron mines are about a dozen miles from the Atlantic & Pacific railroad and can be reached by a spur from that road, or, perhaps, would be in or near the line of the new road to Salt Lake. Not only the iron of Utah, but the iron from these mines also will come here if the Utah coal can be brought here to smelt and manufacture the ores.

San Diego.

VAN WERT.—Julian *Sentinel*, Jan. 24: Ferguson & Wilson are sinking a shaft on the Van Wert mine, north of town. They are down 25 feet and intend to keep going until they strike it rich. There has been a large amount of gold taken out of this mine in former days and the boys have faith that it will pan out again. We should not be surprised to have the pleasure of recording another rich strike soon.

GOLD AND COPPER.—San Diego *Sun*, Jan. 18: Some three or four months ago, Wilson Baldridge entered upon a prospecting tour of the more promising country in the vicinity of Alamo. He has recently returned to refit himself for a more protracted trip. In the course of his explorations he carefully prospected many miles of the country northwest from the present mines, and he claims to have discovered several very promising leads, which will, he thinks, prove as profitable as any yet opened in Lower California. Mr. Baldridge will endeavor to interest some moneyed men in that district, as he firmly believes it will yield as handsomely as the Alamo mines are now doing. Not only did he discover very promising gold leads, but several rich indications of copper, which, he thinks, will assay equal to any ever known in California.

Shasta.

LOWER SPRINGS.—Cor. Shasta *Democrat*, Jan. 22: The company that is operating the Gage place, on the Igo road, is managed by Mr. Beecher. He informs me that the tunnel is now in 130 feet, and he expects to strike the ledge soon. The company has a shaft down upon the ledge over 30 feet, and all in good ore. The Swasey mining property, about half a mile north of the Beecher tunnel, has been sold to a S. F. Co., and three men are now running a tunnel. Halley's find, on Salt Creek, below John Tiffin's old hydraulic mine, turned out \$500 or less. Pugh, of Salt Creek, has purchased the Kempton machinery and is placing it lower down on the creek. Randel, of Redding, has the working of ore from John Tiffin's mine. A young butcher from Shasta has found a very fine ledge of gold ore within 30 feet of the main ledge, which promises to be of considerable importance to this district. Dr. Reese of Shasta is running a deep cut for the purpose of striking the ledge 30 feet below the surface. Doc's mine is noted for producing a splendid lot of good ore.

CALUMET.—Redding *Free Press*, Jan. 25: The very day the Calumet Co. was ready to start its new mill for working by the Paul new dry process, a snowslide carried away some 75 feet of flume which conveyed water to the mill, thus cutting off their power; but this did not stop them, as they at once made connection with their steam-power and started up.

Tuolumne.

RICH.—Tuolumne *Independent*, Jan. 25: The mine of A. B. Cruickshank, at Groveland—the Mary Ellen—is developing into a very rich property. Sixty feet below the old level they have struck the rich shoot worked last year, which is proving as valuable as it was found above. Some of the rock worked before went \$60 per ton, and the present strike is as good, if not better.

CLIO.—Some work is now being done on the Clio mine, near Jacksonville. This property produced some very good rock in early days; a 4-foot vein of \$14 rock was not considered a bonanza then, but it would be now.

POCKET.—Messrs. James Stone & Pedro took out another pocket in their mine, at Brown's Flat, last week. The mine is owned by Mr. John Pedro, of Jamestown, from whom the mine is leased. We are pleased to learn of the young men's good fortune, and hope they will unearth many more. The last cleanup was over \$1500. It is said that the Gale & Wickham mine, at Tuttle town, has been steadily yielding a golden harvest. It is reported that the machinery for the Rawhide mine is about completed at the foundry in Amador county, and that active work will be commenced this spring.

DISSATISFIED.—There is a great deal of dissatisfaction among the miners at the Golden Gate mine, for being compelled to do single-band drilling.

MALTMAN'S chlorination works have started up again, and machinery for a quartz crusher in connection with the works, arrived this week.

WORK on the New Albany mine will be resumed just as soon as the weather will permit.

NEVADA.

Washoe District.

OVERMAN.—By *Telegraph*, Jan. 29: Are stripping ore on the 1200-foot level, near the Seg. Belcher.

NEW YORK CON.—Are timbering the upward continuation of the 800-foot level.

SEG. BELCHER.—Ore bunches are still showing in the 1200-foot level drift from the winze. The 1000-foot level east crosscut is in porphyry and clay.

JUSTICE.—Shipped 257 tons of ore, assays of battery pulp samples showing an average value of \$23.74 per ton.

ALTA.—The mill stamps are hung up pending repairs. We are sinking a winze below the 925-foot level to cut the downward continuation of the high-grade ore from the above level.

UTAH.—The explorations on the 600-foot level were resumed Monday. The mine has a supply of fuel on hand sufficient to keep the hoist plant in operation throughout the winter.

OCCIDENTAL CON.—Continue to extract ore of good quality from the stopes on the third and fourth floors above the 400-foot level. On the 450-foot level we are extracting ore from the third floor. The 500-foot level east crosscut is discontinued, and a west crosscut has been started 70 feet south of No.

3 raise. The 550-foot level line, east crosscut, is advanced 9 feet in porphyry and clay, and the west crosscut is extended 6 feet in quartz, showing value.

Tuscarora District.

NEVADA QUEEN.—Superintendent's Report, Jan. 25: The north gangway from the 600-foot level of the North Belle Isle shaft has been advanced 24 feet. The rock is harder.

BELLE ISLE.—No. 2 crosscut from north gangway on the 350-foot level is extended 13 feet; the rock continues hard. The crosscut near the south line on the 250-foot level is extended 20 feet.

NAVAJO.—No. 2 crosscut from the south drift on the 250-foot level is extended 27 feet; the face is about the same as at last report. The upraise from the south drift on 150-foot level is extended 7 feet. The vein contains much low-grade ore.

NORTH COMMONWEALTH.—The north drift from No. 1 east crosscut on the first level has been advanced 14 feet, exposing fine ore; the face of the drift is all in ore. The east crosscut from the second level station has been extended 20 feet. The formation is changing, and looks like the rock near the vein.

GRAND PRIZE.—The following extensions have been made during the week: 400-foot level—The west drift from the north crosscut is extended 9 feet, and the south drift from the winze 13 feet. 500-foot level—The east drift from the north crosscut, 21 feet; west drift from the same crosscut, 27 feet. There is no change in the above-mentioned workings.

NORTH BELLE ISLE.—The north gangway on the 600-foot level is extended 24 feet. The rock is getting harder. The south drift from the station crosscut on the 300-foot level is extended 13 feet; the face is in vein formation. The south intermediate from No. 3 chute above the 300-foot level is extended 9 feet. The face shows high-grade ore of fair width.

DEL MONTE.—On the first level the drift started to open up ore in the east crosscut is in 9 feet. The ore is high grade and looks well. The joint crosscut on the second level is extended 30 feet, and is being pushed to reach the vein. The north drift on the third level is extended 5 feet, making the total 44; there is good ore the entire distance. Everything about the mine is working well.

COMMONWEALTH.—On the first level the east drift from No. 1 north drift is extended 15 feet. The west drift from the same point is extended 15 feet. No. 1 upraise is up 31 feet, No. 2, 16 feet, and No. 3, 15 feet, all three showing high-grade ore. The opening from No. 1 chute is in a distance of 23 feet and is ready for stopping. The north drift from No. 5 chute is extended 11 feet, with but little change. The stopes on the first, second and third levels are all looking well. We sent 490 tons of ore to the concentrators, the average assay being \$18.24 per ton, and the average of concentrations \$266 per ton. One day was lost on account of the storm. The mill is running well. Bullion was shipped to the value of \$14,952.70. Bullion is on hand valued at \$17,000, and will be shipped to-morrow. Everything about the mine and mill is working smoothly.

ARIZONA.

THE TOTAL WRECK.—Tucson *Citizen*, Jan. 16: The principal mines of this district are the Total Wreck mine, the Red Rock, the Justice, the Denver and the Prosperity, all of which have been producers of the paying ores. The first mine discovered in this district was the Justice mine, some time in 1876. This mine has been worked month by month by leasers, who have always derived a large profit from their leases. Next in prominence was discovered the Total Wreck mine. This mine has been a large producer of silver, yielding about \$300,000 in bullion. This mine following the vein has been worked to a depth of 650 feet. At this, the lowest depth, the ledge is over 50 feet in width but of low grade. Later, during October and November of 1889, work has been done on a hitherto undeveloped part of the mine, between the 350 foot level and 450-foot. This work has developed ores richer than any yet discovered in the mine, several carloads of which have been shipped to El Paso, Texas. All familiar with the Total Wreck mine pronounce it a valuable property and cannot understand why it is not continuously worked. There is one of the best mills in the Territory, built right at the mine, belonging to this property, two steam-hoisting works and extensive pumping machinery to supply water to mill and mine. The supply of water is inexhaustible. Every appliance for the economical working of the mine and mill is attached to this valuable property.

GOLD.—Prescott *Courier*, Jan. 21: The storm caused the Oro Bella mill to suspend action for a couple of days. It is now knocking gold out of quartz. The Ryland mill is crushing away. The Congress and Quartz mountain mills are running day and night. John McDonald recently shipped a big lot of rich silver ore through the Prescott ore works from the famous Blue Dick mine. He will follow this shipment with another shortly. The purchase of the Gray Eagle mine gives the Oro Bella Co. two very fine ledges. E. S. Junior and — Brittingham have plenty of shipping ore on their dumps in Bradshaw mountain. All our miners believe that a great mining camp will soon spring up on Hassayampa creek, near the Senator. Dave Grubb's ledges, Harlan's, Flints, Ross' and other mines. Frank Moss of the Jupiter mine, Antelope mountain, tells the Phoenix *Herald* that he panned out a nice gold nugget from surface dirt which, for an average depth of six inches all over the claim, is placer ground worth \$15,000. Mr. Palmer, ex-superintendent of the Congress mine, reported \$285,000 in sight on the claim from present development.

DIFFERENT CAMPS.—Mohave *Miner*, Jan. 25: John Barry has several men at work on the Minnesota. J. O'Brien has a big streak of galena on the Schuyllkill. Geo. Koster is getting some very fair grade copper ore from the old stopes of the Altatta. Sample and Jamison now have the Bonanza of Layne Springs, 14 inches of 450-oz. ore. Shippee and Sberick are taking out some fair grade ore from the paymaster, on a lease. Uncapher and Finegan struck it good on a new location near the foot of the Ithaca peak. Geo. Dyke and Chas. Frolich have a good streak of ore in their location just east

of the Connor. The whole face of the tunnel on the Empire is in very rich ore, showing much native and ruby silver. Rogers and Brinkley are driving the tunnel on the Ajax and are taking out some rich chloride ore. Erin Sherman has a carload of lead on the Rainbow, which he will ship as soon as the roads and trails get in traveling condition. Mackenzie's bonanza on the Cupel is getting bigger every day, and 25 men are knocking it out and bringing it to the surface at a lively rate. Hoisting works have been bought for the Oro Plata, and will be erected at once. It is reported that C. E. Sherman has leased the Duffett mine in Chloride to Denver parties, who also have a bond on the claim and will immediately begin work on it. The main shaft on the Tuckeyhoe is being sunk as rapidly as the bad weather will admit, and the ore is improving in quality as well as in quantity at each successive foot in depth. Park and Hudgens have a lease and bogged on the Sabbath Bell near Mineral Park and have several men at work sinking the shaft. They have about four inches of rich ore in the bottom. J. W. Marshall is driving the lower tunnel on the Pixley and has struck some rich rock. The Pixley is a parallel vein with the Night Hawk, and is a 12-foot vein of ore lying between a dyke of porphyry and the granite. It is reported that Geo. Bowers has bought out Mrs. Perry's interest in the Night Hawk, and he will put hoisting works on the mine and sink the shaft. Robert Meera and Jas. Cadden will start operations on the Kanawha Belle. This claim has produced and has in sight some of the richest ore ever produced in the county. Heimrod & MacDuffie have purchased a one-half interest in the Sunset mine, near Chloride, from B. McCall, and have started to sink a new shaft. They have a good streak of exceptionally rich ore to start on. C. A. Park has obtained a new lease on the Queen Bee and they will put up some kind of hoisting works and sink the shaft down 150 feet deeper before summer. The bottom of the 100-foot drift on this claim has a showing of an average of six inches of ore for 150 feet in length without a break—ore that has been working from 285 to 600 ozs. silver, and from 3/4 to 4 ozs. in gold. Scores of other claims are being worked all over the district and are producing more ore, and better ore, than ever before in the history of the county, and on the whole there never was a time since the first discovery of ore in Mohave county when there was a brighter outlook or more activity in mining affairs than at present, and every one feels sanguine that by the time summer comes there will be ten times as many men at work in the mines and ten times as much ore being produced as has ever been before.

COLORADO.

TELLURIDE.—Cor. Denver *Republican*, Jan. 25. Telluride is in a fair way to enjoy the boom which will reach us in the spring. Companies engaged in mining are making preparations to keep up with the times, and in Grey's basin a new stamp-mill will be built. Two mills in Turkey Creek basin are now ordered and will be in at an early day. Judge Cartigan, the sole owner of the Belmont mine, is thinking of putting in an electric plant and mill, and the Sheridan mine will run its full capacity of 40 stamps. The Sheridan tunnel, one of the greatest undertakings the San Juan has ever known, will be driven through a mountain a distance of about 3300 feet to connect with the shaft on the Sheridan mine, and will be finished in April if all goes well. This tunnel will tap the vein at a depth of 400 feet lower than the present workings and is expected to open up an immense body of ore. The Gold King now has a small force at work taking out ore, and as soon as water can be removed the mill will start up again, and an increased force of miners put at work. The Illum mill at Ophir will soon begin pounding away on Single Standard and El Mundo ore again. From the large amount of snow that has fallen your correspondent is warranted in saying that the placers down the Miguel river will keep pace with ore lode claims, as several of them are now in the hands of companies who can and will work them if water can be had.

NEW MEXICO.

HERMOSA.—Kingston *Shaft*, Jan. 18: The Pelican mine is showing up better than at any time for the past six months, although from 30 to 40 tons of ore have been shipped from this mine every month. Considering the high-grade character of this ore, what mine in the country is doing better? Culver and Knapp have taken a lease on the Antelope. They commenced work the first of the year. Some of the leasers on this claim are doing fairly well. Dr. North and Wm. Hall have taken a lease on the Ocean Wave, and have good ore to start on. E. F. Holmes has purchased the Wm. Dunn interest in the Argonaut mine, which was owned by Drake & Dunn. Extensive developments may be expected on this claim.

HACHITA.—*Western Liberal*, Jan. 24: John Dennison was up from Hachita yesterday and reports matters as very quiet in that camp.

THE CARLISLE CO. has enough ore mined to keep its mill running for several months, and so has discharged all of its miners but four. The company now has about 40 stamps dropping in its big mill.

FRUE VANNERS.—R. B. Potter, the superintendent of the Humboldt company at Shakespear, informs the *Liberal* that the Frue vanner recently placed in the mill has worked very successfully on Shakespear ore, saving as high as 71 per cent and regularly saving 65 per cent. The company is so well satisfied with this work that it has decided to put in several more vanners, enough to work the mill to its full capacity. The steady running of this mill will add considerably to the prosperity of the camp.

FIFTY-FOUR THOUSAND OUNCES SILVER.—*Silver City Enterprise*, Jan. 21: They say things are quiet at Lake Valley, but there is quite a hum of interest up there now, on the lease of T. B. Savage and Frank Thoman on a 50-foot square piece of ground of the Silver Mining Co. They worked this ground for six months, getting small pay most of the time, but a day or two before their time was out they came into fine ore. The general manager promptly gave them one month's extension of time, and with only two men at work on ore, they have taken out the unusual amount of 54,000 ounces of silver. Savage has in the past four years made two other strikes rivaling this one in value.

The Year's Work at the Mining Bureau.

Through delays in receiving the money appropriated for its support, there was left to this institution but a short working season the past year. Notwithstanding this hindrance, the forthcoming report of the State Mineralogist will, as we understand, reach very respectable dimensions. This report, now in the hands of the State Printer and nearly ready for binding, will contain much information of a thoroughly utilitarian kind, very little space having been given up to speculations or theories unsupported by facts. The most of this information has been embodied in a series of articles, each treating of some special subject connected with the mining interests and industries of the State.

The most important feature of the report, however, consists of the field-work performed during the year, and which has gone to the collecting of data for a complete topographical map of the State, this to serve as the basis of the projected geological map to be constructed thereon. This work, of which a good beginning has been made, will now be followed up and vigorously prosecuted the coming summer, it being the intention of Mr. Ireland to start out a corps of assistants as soon as the weather will permit, preparations preliminary to that end having already been completed. Operations will commence on the southern border of the State, whence they will be extended northward. That they will, by reason of the unusual snowfall on the Coast Range and adjacent mountains be delayed beyond the expected time, now seems probable. The topographical map, which is to comprise the results of all official surveys heretofore made in California, will, however, be completed in time to go with the next Annual Report of the State Mineralogist.

The contents of this volume have been prepared by men thoroughly qualified by education and practice to well perform the several tasks assigned them. This has insured for the papers that go to make up the body of the report, a value that would not attach to the work of the mere empiric or the tyro. Where it is sought to use this information it can, as a rule, be relied upon, nor will it ever be found grossly misleading.

We have always contended that the work of the State Mineralogist should be of a more practical kind than characterized some of the earlier reports emanating from the Bureau. To devote the whole or most of a volume to a description of a single mineral product seems hardly politic, however perfect such a description or however important such product may be. Whenever especially full and detailed information is in any particular case required, it can be obtained from other sources, generally within the easy reach of the student, and may therefore well be dispensed with in a volume designed for common use.

We have in former issues of the *PRESS* expressed the opinion that the information of which the miners, as a community, most stood in need was such as related to the best methods extant for ore extraction and reduction, including a description of the mechanisms, modes and processes employed to that end. They want to be more fully posted on the subjects of ore crushing and smelting, amalgamation, concentration, chlorination, etc. Happily the present State Mineralogist, with a just comprehension of these underlying wants, has from the first worked in the direction of supplying them as far as may be.

Looking over the several reports prepared by Mr. Ireland, we find them almost wholly given up to matters bearing on the solution of the above questions, some of the monographs published in these volumes amounting to a complete treatise on the subject considered. Take for example the paper on the building and outfitting of quartz-mills; we don't see why a tolerably good millwright might not go on, select a site, put up and equip a plant of that kind, and do the work fairly well guided by the instructions contained in that paper alone; nor could such mechanic go far wrong if, in selecting a water-wheel, he studied what is said a few pages further on concerning structures of that kind. And so of much more that requires to be learned from trustworthy sources. It can be found in this series of reports, the information so conveyed being not only author-

itative and practical, but brought down to most recent dates.

The mineral specimens sent to the Bureau have been very numerous of late, some of these coming from distant and widely separated localities. And thus the cabinet, already large, grows apace, this collection comparing favorably with others its seniors by many years. The classification and arrangement of these numerous samples is both systematic and scientific, being grouped into families, and these subdivided into species, all properly labeled and so displayed that they can be readily recognized and examined. Besides metals and minerals, many other things have been contributed to the Museum, some of these being rare and curious, a few possessed of much intrinsic value.

It is worthy of remark that this large and valuable cabinet has cost the State very little, nearly all the specimens having been collected by the State mineralogists and their assistants while in the field, or through exchanges effected with similar establishments elsewhere, not a few having been donated by the devotees of science or other patrons of the institution. The Bureau and everything connected with it is kept in admirable order, both the convenience and comfort of the attaches and visitor to the place having in all its appointments been consulted. As the Museum has undergone steady enlargement, so has the number of its visitors been constantly on the increase, many of these being residents of other States or of foreign countries. Few foreigners who come to this city fail, in fact, to pay the Bureau a visit.

The Astronomical Society.

At the meeting of the Astronomical Society of the Pacific on Saturday last, Vice-President Wm. M. Pierson occupied the chair, President Holden being snow-bound on Mt. Hamilton. The secretary announced the receipt of 75 presents and publications, among which were two large drawings of Jupiter by Prof. Keeler, made at the Lick Observatory in July, 1889. A committee to nominate directors was appointed. The chair announced the success of the Lick Observatory eclipse party sent to South America by Col. C. F. Crocker. The following new members were elected: Adolph Sutro; Mateo Clark (life); Jose A. y Bonilla, Zacatecas, Mexico; Leon K. Fuller, Brattleboro, Vt.; Fred G. Wattles, Denver, Col.; Prof. M. W. Harrington, Director Ann Arbor Observatory; Hugh Howell, Oakland; Prof. Ira Moore, State Normal School, Los Angeles; T. S. Palmer, Sup't of Agriculture, Washington; J. L. Scott, Shanghai, China; P. V. Veeder, San Mateo. The total membership is now 190.

A paper on "The Physical Appearance of Jupiter in 1889" was read by Mr. Keeler and illustrated by 24 drawings, made during the opposition of 1889, with the 36-inch equatorial at the Lick Observatory. Reference was made to the extremely satisfactory views obtained with the great telescope, and a resume given of the different kinds of astronomical work in which the instrument had proven proficient.

This paper was followed by one entitled "A New and Simple Form of Electric Control for Equatorial Driving-Clocks," also by Mr. Keeler. This ingenious contrivance is attached to the driving-clock of the great refractor of the Lick Observatory, and is giving great satisfaction.

It was announced that the directors, with the approval of Alexander Montgomery, had determined to expend \$1000 of the Alexander Montgomery fund to found a library for the society, named after the donor, and the remainder of the fund (\$1500) is to be invested, and the income only to be used in the preserving and enlarging the same.

On the Comstock there has been a total suspension of operations in leading mines with the exception of the Justice, Alabama and Occidental, on account of the impossibility of moving ore trains and the scarcity of fuel for operating the steam-hoist plants. The pay-rolls of mines for the current month will fall \$150,000 short of the usual average and the bullion yield of the Comstock will be curtailed half a million.

CAPTAIN J. M. KEELER, formerly connected with mining affairs, and who became quite prominent in Inyo county a few years since, died in San Francisco this week.

At La Porte, Plumas county, the snow lay 20 feet deep on a level.

Taxes on Real Property.

Adjustment Between Seller and Purchaser.

Though an investigation of the law at any time since the organization of this State, and certainly since its laws were codified, would have resulted in a full knowledge of this interesting problem, it is strange that its solution has been, and is now, unknown to those most interested, and until recently we have had no satisfactory settlement of the question.

In a late case of Brown vs. Yost, which came before Judge Wallace of the Superior Court of S. F. on appeal from the Justices Court, a decision was rendered Jan. 13, 1890, which is undoubtedly the true solution. Judge Wallace, in an able opinion, holds that the tax becomes a lien which attaches as of the first Monday in March of each year (Pol. Code, Sec. 3718). Further, that this lien having the force and effect of an exaction duly levied (Pol. Code, Sec. 3716) is "an incumbrance." That when a grantor makes a conveyance in which he uses the word "grant," he covenants that the property is free from incumbrances done, made, or suffered by the grantor (Civil Code, Sec. 1113). That the term "incumbrances" includes taxes, assessments and all liens on real property (Civil Code, Sec. 1114). Therefore, the grantor must make good his covenant by removing the tax lien created as of the first Monday in March. If real property is conveyed at any time after the first Monday in March by a deed using the word "grant" (which is the common form of deed), and no other words are used to restrain the Code presumption, the seller must pay the taxes for that year; and this is true even though the amount be then unknown, and the tax not yet due and cannot then be paid. If the seller do not pay the taxes, the purchaser can do so to prevent sale for delinquent taxes, and then recover from the seller in an action on his covenant.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, department 10, San Francisco:

SAN FRANCISCO SYNOICATE AND TRUST CO., Jan. 20. Object, to manage real estate and loan and borrow money. Capital stock, \$100,000. Directors, C. E. Mayne, R. T. Pittingill, H. S. Smith, D. Z. Ashly and G. H. Perry.

SONORA M. CO., Jan. 22. Capital stock, \$50,000. Directors—J. H. Neale, E. M. Thompson, C. A. Stratton, A. F. Collins, J. J. Nachrich, A. F. Johns and Geo. A. Carter.

SARATOGA PACKING CO., Jan. 22. Object, orchard cultivation and to deal in fruits. Capital stock, \$50,000. Directors—Robert Balfour, Frank C. Beazley, Geo. W. Spencer, Chas. Page and Chas. P. Ellis.

LUCKY DOG CON. M. CO., Jan. 28. Location, Sierra county. Capital stock, \$500,000. Directors—Robt. Stuart, S. J. Howard, R. S. Briggs, D. L. Howard and B. R. Low.

DEL MONTE VINEYARD & PACKING CO., Jan. 28. Capital stock, \$50,000. Directors—L. A. Kelley, H. W. Snow, E. Coker, J. J. Harlow and E. E. Burt.

Meetings and Elections.

Annual meetings and elections have been held by the following mining companies:

BELCHER M. CO., Jan. 28: Directors—James Newlands, J. H. Robinson, A. K. P. Harmon, Geo. D. Edwards and J. P. Martin. The following officers were appointed: President, James Newlands; vice-president, A. K. P. Harmon; secretary, Chas. L. Perkins; superintendent, Sam L. Jones, and treasurer, the Bank of California. The appointment of Mr. Perkins to the position of secretary was the only change made in the Board of Officers.

UTAH CON. M. CO., Jan. 29: Directors—H. B. Havens, Geo. R. Wells, Jos. Marks, Herman Zidig and J. J. E. Hawkins. The following officers were appointed: President, H. B. Havens; vice-president, George R. Wells; secretary, A. H. Fish, and treasurer, the Nevada Bank. The financial statement submitted showed a cash balance in the treasury of \$8766.22.

DANGER TO MINERS.—Owing to the long-continued storm and danger of traveling in the snow, there is fear that miners living alone in different parts of the mountains have suffered greatly. During the clear weather several parties have been formed in different portions of the mountains to visit parties living in out of the way places, who had not reported since the commencement of the storm. In two or three cases the people searched for have been found dead, and several were discovered who needed relief. It is feared that many more of the old miners, who have lived alone in the mountains for years, and who stuck to their claims in hopes of striking it rich, have fallen victims to the terrible winter.

The Seattle Relief Committee is using part of the unexpended subscriptions for the relief of the fire sufferers to alleviate the miseries of the poor of that city.

MECHANICAL PROGRESS.

The Railway and the Shop.

The Year's Progress in Improvements.

According to the *Railway Review*, the year just closed has been one of marked progress in all matters pertaining to the motive-power and rolling-stock of the railways of this country. In locomotive practice there is a noticeable change in the style and weight of engines for certain kinds of work. Moguls and ten-wheeled engines are being used to a great extent in fast passenger service, quite a number of roads having, for the first time, put them into regular passenger service during 1889, and several others are giving or are about to give their first order for this class of passenger engines. There are two principal reasons for the adoption of these engines for this work during the past few years; the first is the necessity of greater weight for tractive power, and the second is the more universal realization of the fact that one of the first requisites of an economical locomotive is a large boiler.

A great amount of attention has also been given to compound locomotives in the last 12 months, and at present there are two compound locomotives of American build and design and one of English make running on American railways. When it is remembered that a year ago there was not a compound locomotive running on this continent, and very little interest was manifested in them; that now there are three in operation and a fourth soon to be out of the shops, and that at least three other roads or builders intend to have compounds in operation at an early date, it is evident that the interest is spreading and that this type will receive an extended trial. All these studies and improvements tend toward a greater economy in the movement of trains.

Another practice has made some headway during the year which is destined to have a great effect upon the economies of locomotive running, and that is the instruction of engineers in regard to combustion and the use of steam.

In freight-car construction the tendency toward cars of great capacity is more noticeable than ever. Roads which a year ago thought they had no use for cars of more than 40,000 pounds capacity are either building 60,000-pound cars or are compromising by using 50,000 pounds as a maximum capacity. The dimensions of the axle for these heavy cars have been virtually settled by the M. C. B. standard adopted recently.

The use of so many heavy cars, and the greater speeds of freight trains, have forcibly directed attention to the inefficiency of the hand-brake, and during the last 12 months the automatic air-brake has been applied to a larger number of freight cars than during any other year. The adoption of automatic air-couplers has gone on with surprising rapidity during the year, it being estimated that about 40,000 freight cars were so equipped.

Heating and ventilating are not making particularly rapid strides, except where the law compels action. In train lighting much experimenting has been done with electricity, gas, gasoline, etc. The days of the kerosene lamp are evidently numbered, but just what system of lighting will take its place is not so evident. Train signals, which will take the place of the ordinary bell-cord and gong in the cab, have been applied to a limited extent. Air signals have met with the most favor, though electric signals have been tried.

In shop practice there has been some improvement in handling materials. Overhead power cranes, electric transfer tables, power hoists, and special tools are used in greater numbers. Perhaps one of the most noticeable features is the rapid strides which electricity has made in shop practice. Beginning with the lighting of shops, it has frequently been used to drive transfer tables, and its application is extending to overhead cranes and large isolated tools, or to any other work where the ordinary means of furnishing power are less suitable. There is still a large field for electricity to occupy in railway shop work. There seems to be only one case of flat failure of the application of electricity in railway operation during the past year, and that is as a locomotive traction increaser. It was given a practical trial on one road, but with the exception of a few exaggerated reports in the daily newspapers, no results have been made public, though their appearance has been anxiously awaited.

CAN IRON BE GLUED?—By a new method of cementing iron the parts cemented are so effectually joined as to resist the blows even of a sledge-hammer. The cement is composed of equal parts of sulphur and white lead, with a proportion of about one-sixth borax. When the composition is to be applied it is wet with strong sulphuric acid and a thin layer of it is placed between the two pieces of iron, which are at once pressed together. In five days it will be perfectly dry, all traces of the cement having vanished, and the work having every appearance of welding.

A NOTABLE CASTING.—The Chinese have hitherto excelled in large and exceptionally thin castings; but the following item from the *Chicago Journal of Commerce* would seem to imply feats of an equally, if not more, difficult character than can be performed by our own mechan-

ics: A very remarkable specimen of casting work is on exhibition at the office of Messrs. Charles Himrod & Co., in the Rookery building in this city. It consists of a cylinder six feet high, 20 inches in diameter and only one-eighth of an inch thick. Expert foundrymen have pronounced the manufacture of this casting a notable feat. Its difficult nature will perhaps be better comprehended by the statement that it is equivalent to casting a plate six feet long and about five feet wide and only one-eighth of an inch thick. The casting is perfectly sound and weighs 160 pounds. It was made by Turner, Dickinson & Co., of Chicago, and Calumet pig iron was exclusively used in its production.

Perfect Screws.

The first thing a machinist does when examining a machine tool which he intends to buy is to take hold of the handles which are attached to the various feed-screws, and test the amount of play the screws have in the nut; or, in other words, how much he can turn the handles loosely without moving the slide or the carriage. Seldom he has anything to say after this test. Is it because he has never found a screw absolutely without play, or does he know that the accuracy of his work which he intends to do on the machine does not, in most cases, depend on this difficulty? If you go into a shop and make this same test on the various machines, you will probably be quite surprised how much back lash the screws have, either by worn threads or end play between collars. The screws are hardly ever replaced by new ones until they refuse to move the slide at all, and yet the men are turning out good work. This is especially true in busy times. While it seems that a screw with much play in working operation is not a serious objection, it is quite an objection on a new machine with little play.

Supposing we make a screw with a compensating nut, whereby it is possible to adjust the nut in a very sensitive manner, to take up the lateral play completely, then run a screw through it 24 inches long forward and back two or three times. Examination will show that the nut needs more adjustment. This difficulty is due to the irregularity of the screw-threads. Every time the thicker threads pass through the nut it will wear it to a certain extent, and there will be play on some portions of the screw. Now, then, the question arises, is it possible to produce a perfect screw on lathes, as they are built for the market at present? In the first place, I do not think that two lathes are made with lead screws alike.

Supposing we have two lathes with perfect screws, it is questionable whether two screws chased on these two lathes would be exact duplicates, or that the finished screws changed from one lathe to the other would not show variations by passing a tool through them. I am of the opinion that lead screws on all lathes are too small in diameter. They are subject to a certain amount of twisting strain, and will in due time get out of true, especially if heavy cuts have been taken.

There should be a lathe built specially constructed for chasing accurate screws, in which one would not be dependent on the give of the various joints between the feed-nut and the cutting tool. On the present lathes the lead screws are too far away from the tool, the leverage being too great. A lathe for the above-mentioned purpose need not have more than six inches swing, the spindle should be close to a rigid head, and the lead screw located in the rear on the top of the carriage, where it can be covered partly and kept clean; and last, but not least, the tool brought close as possible to the same. We all know how important it is to have the two screws on the plunger, which elevate and lower the saddle alike, in order to keep it parallel with platen at any height. The shape of the threads seems to be an unsettled question among lathe-builders. We use lead screws all the way from the U. S. Standard V (flat top and bottom), to perfectly square threads. I hope to see the day when lathe-builders will make lead screws uniform with correct threads. I would like to see this subject thoroughly illuminated, and am sure whatever may be said by our mechanical brethren who have had the benefit of special experience in this line will certainly be appreciated by the readers of this paper.—*American Machinist*.

THE OTHER SIDE OF THE WATCH-SPRING STORY.—"If you want to make the most out of a little," said the jeweler, "buy a pound of steel and work it into hair springs for watches. The product will sell for \$140,000." "And then I would be \$140,000 in," said the apprentice, who had enough laid by to get the pound of steel. "No," replied the master; "it would cost you about \$139,000 and all your life to make the springs."—*R. J. Burdette*.

The quickest way to harden iron, if in small sizes, is to heat it to a cherry red, then sprinkle upon it some cyanide of potassium, and heat it to a little above red, and then dip. Cyanide of potassium is a deadly poison.

A SINGLE BELT running at the rate of 800 feet per minute, or a double belt having a running rate of 500 feet per minute, will transmit one horse-power for each and every inch of its width.

SCIENTIFIC PROGRESS.

Thermal Repulsion.

The well known publishing house of John Wiley & Sons, 15 Astor place, New York, has recently issued an anonymous volume of 60 pages, entitled "The Cosmic Law of Thermal Repulsion," a somewhat singular production, the general merits of which, although anonymous, are sufficiently guaranteed by the standing of the publishers. The book sets forth positions in philosophy both startling and full of interest. It claims to be "an essay suggested by the projection of a comet's tail," and the subject-matter is thus tersely introduced: "Thermal repulsion, like gravitational attraction, is universal between masses as well as between molecules of matter." The origin of the book is thus described:

"The immense projection of the tail of the great comet of 1832 led me to suspect that the phenomenon resulted from an outward push exerted by the radiant energy of the sun on the matter of the comet, and that the matter which thus yielded to the push and was projected outward was that portion of the comet which had become superheated as the body approached the sun. The force causing the outward projection evidently came from the sun; the matter projected had been reduced to great tenuity; the form of the tail indicated that the outward push was exerted against the entire body of the comet, and that the particles projected yielded to the force as they became surcharged with the sun's radiant energy. This explanation involved the hypothesis that the expansive force of heat was not confined to moving outward the molecules of a separate mass of matter, as in the ordinary phenomenon of expansion, but that it was operative between the sun and bodies in space; in other words, that thermal energy exerted on all matter a push outward from the center of gravity, just as gravitation exerts a pull inward toward the center of gravity.

"Further reflection during subsequent years strengthened my belief in the truth of this hypothesis; and recent advances in physical science furnish evidence which appears to me to be sufficient, when considered in connection with other well-known physical phenomena, to prove the existence of the supposed cosmic law.

The Primary Principle Deduced from the Foregoing Passage.

"In attempting the induction of a Cosmic Law from the phenomena of nature, it is of course necessary to consider the whole subject of nature; and in doing so, the first thing which strikes the attention is the difference between those things in nature which are matter and those things which are not matter. For instance, the table on which I write, and the pen, ink and paper with which I write, are matter; but the intelligence which directs the pen in making letters on the paper is not matter. It is force imparting motion to matter."

This forms the key-note to the entire book, introducing philosophical deductions, of which the following are some of the head-lines: "The Operations of Natural Forces;" "The Field of Operation of Natural Forces;" "Forms of Matter;" "The Earth's Attraction on Liquids and Gases;" "Effects of Gravitation on Molecules of Gas;" "Effect of Heat on Matter;" "Conjugal Antagonism of Heat and Gravity;" "Gravitation and Thermal Energy on Meses of Matter;" "Planetary Matter—Comets;" "Motion Imparted by Heliofugal Power Resisted by Cohesion and Gravitation;" "Outward Push of Heliofugal Power;" "Heliofugal Power Causes Planets to Revolve;" "Difference in Speed of Axial Rotation."

The result of the author's studies upon these varied topics is summed up as follows:

"The well-known phenomena of nature which we have been considering demonstrate that there is an essential difference between matter and force in the constitution of Nature; that force is not in one form, but in many forms, and that two of these forms or manifestations of force, heat and gravitation are ever present and in active operation where matter exists; that these forces operate on the molecules constituting a separate mass of matter, the force of gravitation being a pull inward toward the center of mass, and the force of heat being a push outward from the center; that outward and inward motion of the molecules is the result of the predominance of the one or the other of these forces, and that the motion (contraction or expansion) is uniform, except when intercepted by some other force; that the inward pull of gravitation between separate masses of matter is identically the same as the pull between the molecules of a single mass; and that, while it has not yet been fully demonstrated, we are justified in assuming that the outward push of heat is the same between separate masses of matter as between the molecules of a single mass. This being true, it follows that all matter in nature is held suspended between these two forces of attraction and repulsion. Within the earth itself Nature has stored up heat more than ample to reduce all forms of matter to the most tenuous gas, and the immense outward push of this vast self-acting boiler counteracts the inward pull of gravity; and thus it is that thermal repulsion and gravitational attraction hold in position the very ground beneath our feet. The

end of the world, as we know it, would come by an explosion or contraction, if either of these forces was suspended for an instant."

CHINESE THEORY OF EVOLUTION.—The idea of evolution is not altogether a modern conception. In this domain of research, the Chinese, as in almost everything else, come to the front. Adele M. Fiedle in *Popular Science* describes the Chinese idea as follows: "The rocks are the bones of the divine body the soil is the flesh, the metals are the nerves and veins; the tide, wind, rain, clouds, frost and dew are all caused by its respirations, pulsations and exhalations. Originally the mountains rose to the firmament and the seas covered the mountains to their tops. At that time there was in the divine body no life besides the divine life. Then the waters subsided; small herbs grew, and in the lapse of cycles developed into shrubs and trees. As the body of men, unwashed for years, breeds vermin, so the mountains, nerved by the seas, bred worms and insects, greater creatures developing out of lesser. Beetles in the course of ages became tortoises, earthworms became serpents, high-flying insects became birds, some of the turtle-doves became pheasants, egrets became cranes, and wildcats became tigers. The praying mantis was by degrees transformed into an ape, and some of the apes became hairless. A hairless ape made a fire by striking crystal upon a rock, and with the spark struck igniting the dry grass. With the fire they cooked food, and by eating warm viands they grew large, strong and knowing, and were changed into men."

THE STUDY OF ECLIPSES.—The physicist and astronomer, says a contemporary, have of late become more closely related in their work. In old times the observations of eclipses were principally for the determination of data of time. Recently the constitution of the sun and the corona surrounding it have been one of the principal objects of eclipse observation. Recent progress in photography lends itself admirably to this line, and the work done during the present eclipse has been largely accomplished by photographic methods. The corona is the circle of rays that is seen emanating from behind and all around the moon when the sun is totally eclipsed. Its exact nature is unknown. Various theories have been advanced. It has even been attributed to a lunar atmosphere. It is, however, tolerably certain that it has a real and objective existence. It cannot well be regarded as a reproach to modern science that we know so little of it. We are on the average granted but a few hours in a century in which to see it. The late eclipse of Dec. 23 did not afford much opportunity for observation. Its path was unfortunate and the weather at the various points selected for observation was anything but favorable. Accounts from the American party in Africa, however, indicate fair success. Seventy photographs were secured before totality, and nearly as many after totality. Clouds interfered with the work during totality.

DIFFERENT HEAT CONDUCTING POWERS OF METALS.—If we hold the end of a rod of silver in one hand, and one end of a rod of iron in another, and place the opposite ends in a fire, we soon become aware that there is a great difference in the heat conductivity of the two metals. The following table shows the relative conducting power of the several metals named. The differences observed will no doubt be a surprise to many:

Silver.....	100	Iron.....	12
Copper.....	74	Lead.....	9
Gold.....	53	Platinum.....	8
Brass.....	24	German Silver.....	6
Tin.....	15	Bismuth.....	2

CONTROLLING THE BOUQUET OF WINE.—It appears that the flavor of a wine depends less on the nature of the soil in which the vines have been grown than on the ferment employed. The wine ferments which have hitherto supposed identical, and which have received the name *Saccharomyces ellipsoideus*, are various, and communicate different qualities to the most in which they set up fermentation. The juice of the "chasselas" grapes of the south of France can, by a change of ferment, be made to yield high-class (*grands crus*) Burgundies.—*A. Rommier*.

AN AEROLITE AT SEA.—The ship *Glaucine*, which lately arrived at New York from Newcastle, had a narrow escape from a falling meteor at 1:20 P. M. on December 10th, while off "Crocodile Head." A heavy thunder-storm was raging when a sharp report was heard, followed by a sharp, whizzing noise directly overhead, and simultaneously with this an aerolite was observed to drop into the sea in dangerous proximity to the vessel. The splash of the substance sent the water flying to a height of 80 feet or more.

ECONOMY IN COMBUSTION.—The absence of thick, black smoke from a furnace is not evidence of a perfect combustion. The amount of carbon passing off even in the heaviest and blackest smoke is quite small when compared to the loss which may arise from the escape of almost invisible unconsumed gases without the appearance of black smoke.

In Sweden a new elevator loads a 2500-ton vessel with iron ore in a day.

GOOD HEALTH.

The Prevailing Disease.

The prevailing disease, "la grippe," is still holding sway over most parts of Europe, as well as the United States. In this country, and especially on this coast, it seems to have taken on a much milder type than elsewhere. Contrary to common report, it is no respecter of persons—it extends its grip to all alike, rich or poor, learned or unlearned.

Although it is no new thing, still its characteristics and mode of treatment do not seem to have been so carefully studied during any of its former manifestations as during the present one.

Its Germ Origin Proven.

One of the most important discoveries connected with its present manifestation is the quite generally conceded fact that it is produced by "bacteria," and quite recently, by telegraph, from Vienna of Jan. 22d, we are informed that two physicians of that city, after some two months of study and research, have succeeded in discovering the particular "bacillus" which is producing the "grippe." It is described as new, and differing materially from any heretofore discovered. Its distinguishing mark is the form of the head, which is mitre-shaped. Hence it is called Bishop bacteria. This unwelcome visitor is, moreover, said to be the most active of all the microbes yet discovered, it being almost impossible for the eye to follow its movements even with the aid of the most powerful microscope. From the marvelous activity which, it is reported, they show in their movements, one can readily imagine the destruction they can cause when once they secure a lodgment in the human system. The chief of the two discoverers has been for six years professor of bacteriology at the University of Wurtemberg. He has succeeded, with these microbes, in producing influenza in rabbits by inoculation, thus proving the genuineness of this discovery.

In his researches to learn the source of these microbes, he soon found them in water from a well in the Syrian mountains, more than 300 miles distant from Vienna. Not less than 228 specimens were counted in a half cubic inch of that pure mountain well-water.

Nature of the Disease.

An eminent retired Boston physician has quite recently given to the Boston Herald some interesting and especially valuable information as to the nature and treatment of the disease which is well worth consideration. He says the malady is not a disease proper, but a disorder, and confined chiefly to the nervous system. It is a safe, but a very uncomfortable, disorder. It does not cause pneumonia; but it increases the susceptibility, in the old, feeble and young, to the attack of that malady. It is the old-fashioned malarious fever, not at all dangerous of itself. It is not contagious. A person exposed in any way to its peculiar microbes is liable to its attack. The disease does not manifest itself with invariable symptoms. In some persons it appears as a true fever—"little fever"—and the air passages are not affected. In others, there are all the distressing manifestations of a severe "cold in the head." In the fever type, quinine acts well—in large doses—and is a safe medicine to give. In other types but little good is derived from it.

The Treatment of the Disease.

According to this physician, is recommended as follows:

As soon as one feels the first symptoms, he should at once go home, either take a hot, full bath or foot bath, and get into bed and stay there for three days. This matter of confinement to bed for the length of time stated is an important one; there would be some danger in leaving it sooner. He will do well also to send for a physician; but if he must treat himself, let him take acetanilide. It is safe if used in anything like reason. Druggists have on sale five-grain tablets of this medicine. An adult may take one tablet every hour, if needed, for several hours. Acetanilide lowers the fever and relieves the pain in the head and body, and it also quiets restlessness. Probably the good effects of the drug will be apparent after the second or third dose. If so, it need not be taken oftener than two, three or four hours, as the case may be. If the attack does not yield within six hours, one tablet of acetanilide may be taken every hour during that time. After that, it is best to dose a little less often and take a tablet, say, every three or four hours if needed. As soon as improvement is noted, the intervals between the doses should be lengthened, and discontinued altogether as soon as the fever is rapidly abating and the pains are subsiding. Some time during the first 24 hours, it will be well to take a purge; two or three compound cathartic pills will act freely.

As to the dietetic treatment, the starvation sort is the best, at least for persons attacked while in fairly robust health. Milk will meet all the requirements. Stimulants are forbidden, except, of course, they are ordered by a physician. The headache in "influenza" is not likely to yield until the associate symptoms have abated. Some relief can be obtained from an application of menthol—one drachm in ten drachms of alcohol. This should be applied with a small sponge. Hot foot baths administered once in six or eight hours at first have

some good effect, easing the head a little and tending to quiet the restlessness. Mustard pastes can be applied to the back and other painful parts.

As to Preventive Treatment.

It is a positive fact that those who live generously and exercise but little, and so allow their systems to become choked up with waste, are the most liable to take cold. It appears, also, that those who take cold the easiest are the readiest victims to the prevailing distemper. Hence to eat lightly and only of simple and easily digestible foods, would suggest itself as one of the important essentials. To exercise freely in the open air is another. The bowels should be active. If they are naturally so, they need not be interfered with; but if not, they should be stimulated by laxative foods, fruits, etc., or by some gently acting medicine. Hot drinks, be they tea, coffee or alcoholic stimulants, should be eschewed. To dress properly, live in pure air, and be discreet under exposure, are other essentials to health, and so are important as preventive measures. The medicinal treatment recommended in the foregoing is for adults only.

USEFUL INFORMATION.

THE PROCESS OF CLEANING CLOTHES.—The mystery to many people how the scourers of old clothes can make them almost as good as new is explained in the *American Analyst* as follows: Take, for instance, a shiny old coat, vest or pair of pants of broadcloth, cassimere or diagonal. The scourer makes a strong, warm suds, and plunges the garment into it, soaks it up and down, rubs the dirty places; if necessary, puts it through a second time, then rinses it through several waters and hangs it up to dry on the line. When nearly dry, he takes it in, rolls it up for an hour or two, and then presses it. An old cotton cloth is laid on the outside of the coat and the iron passed over that until the wrinkles are out; but the iron is removed before the steam ceases to rise from the goods, else they would be shiny. Wrinkles that are obstinate are removed by laying a wet cloth over them and passing the iron over that. If any shiny places are seen they are treated as the wrinkles are—the iron is lifted while the full cloud of steam rises and brings the nap up with it. Good broadcloth and its fellow cloths will bear many washings, and look better every time because of them. The same treatment may be applied to women's dress goods. If all wool, they may be renovated to look like new.

THE DEFALCATIONS OF ROGUES during 1889, in the United States, each of whose stealings have equaled or exceeded the amount of \$100,000, aggregate \$8,562,753, or an average of \$329,813 each. The number of these big rogues was only 23. If to them were added all the minor rogues, who have stolen less than \$100,000 each, the general aggregate would probably be more than doubled, giving a sum equal to the total expenses of the Navy Department for the past year, or fully half that of the War Department. It does seem as though such an immense aggregate of thieving should and might in some way be reduced. The proposed closing of the Canadian thief quarters, if carried out, will probably effect some reduction during the present year.

INCREASE OF WEALTH.—The \$40,000,000 left by John Jacob Astor, in 1849, has grown to \$200,000,000. If this property continues to increase at the above rate for 40 years more, it will aggregate \$1,000,000,000! And why should it not thus continue? This, like many other wealthy families, have adopted a policy to secure their chief accumulations to the heads of their respective families. Experience shows that such fortunes are not widely distributed. Have our statesmen given a due consideration of what will be the result of such or even an approximate accumulation in the hands of say 50 of our present most wealthy families within the next 50 years?

HOISTING ROPES.—Oiling a hoisting rope, which is exposed to the weather, may possibly give it a longer life, yet as a drawback it is certain that it induces a species of heating and tends to spontaneous combustion. On ships, standing rigging or ropes are tarred, to preserve them; but all running rigging is left in its natural state. Wire hoisting ropes are now made with hemp cores, which are said to be very durable.

PREPARING MILK FOR SHIPMENT.—A Chicago chemist has devised a method of so preparing milk, after a small portion of the water has been removed from it, that when so purified and refined, it will keep sweet for fully 30 days, and can be shipped anywhere, and when the water has been replaced, is in as good if not better condition as when it left the cow, and cannot be distinguished from milk six hours old.

DIGGING EARTHWORMS.—Some one who has had experience says: "I supposed every one who, when a boy, dug earthworms for bait fishing, was familiar with the fact that they will come to the surface if the ground is thumped. Whether they do so thinking it is rain or because, as I think more probable, they find the vibration uncomfortable, I do not know."

ENGINEERING NOTES.

Ancient Engineering.

We talk a great deal about the wonderful achievements of modern times in canal building, tunneling and other excavations, too often forgetting or considering of little account ancient achievements of like character.

Diverting the Euphrates.

The earliest work of magnitude of this character of which we have any direct knowledge is probably the turning of the Euphrates by Cyrus as a means for his entry into Babylon. This work was determined upon only after a two years' siege. The great depth and width of this river are sufficient to stamp this piece of engineering work as one of vast magnitude and no little difficulty, to say nothing of the fact that its accomplishment led to the downfall of the mightiest city of ancient, or perhaps of modern, times.

The Next Great Feat

Of this kind was accomplished by Xerxes, 480 B. C., who cut a canal across the isthmus of Mount Athos to facilitate his conquest of Greece. The work was herculean in character, especially when we consider the inefficient means for snub work at the command of the engineers of those days. His fleet of over a thousand ships was enabled to pass through and thereby avoid the dread dangers of the stormy promontories which had been the ruin of so many ships before his day.

The Original Suez Canal.

We can say but little of this work, as we know of it only by the excavations which were found by the engineers of the present canal, which follows very nearly the course of the old one. In regard to when or by whom that great work was accomplished, history is silent.

The Drainage of the Valley of the City of Mexico.

As is well known, the City of Mexico is situated in a deep valley, surrounded by mountains everywhere except at one point where a narrow canyon furnishes a limited outlet for the immense body of water which flows into that valley, especially during the heavy rains which sometimes almost deluge the city and its surroundings. This great danger and discomfort to health and commerce was seen and felt by the early Spanish invaders who took possession of that ancient city, and measures were taken to abate it. The first plan adopted to accomplish this work consisted of an attempt to divert the waters of one of the principal rivers from its natural channel to the outer slope of the watershed and thus prevent their reaching the plain of the city. To effect this, a channel had to be dug and a tunnel over three miles in length had to be excavated. The work was completed, but it failed to accomplish the purpose desired on account of the tunnel becoming constantly choked with debris. This trouble was remedied by converting the tunnel into an open cut. The original work was begun in 1607, but the open cut was not completed until 152 years later. During the accomplishment of the first work it is said that 470,000 natives were employed, and 50,000 perished from sickness and casualties. In the after-work of converting the tunnel into an open cut, the labor was enormous. The length of the cutting was about 13 miles, and for the distance of nearly a mile through the rocky divide, the width of the opening at the top was from 270 to 360 feet, and the perpendicular depth from 147 to 196 feet. For the distance of nearly 3 miles, the depth was from 93 to 164 feet. Humboldt visited and examined this work in 1804 and found the width of the channel at the bottom to be from 9 to 13 feet, with side slopes from 40° to 45°. Such work accomplished at that age of imperfect appliances was truly wonderful and may well be compared with the Suez or any other canal work of the present day.

A New Electric Storage Battery.

A patent has recently been granted to Messrs. Bradbury & Stone of Lowell, Mass., for a new storage battery which it is claimed presents decided advantages over any one now in use. The same principle of construction is used in this battery as obtains in most storage batteries, except in the manner of construction of the plates which are inserted in the acid. Here lies the secret of their battery, which they claim can be built 25 per cent cheaper than any other battery, while 25 per cent more power can be developed from it. The construction of the plates is peculiar. The size of the plates is but 6 1/2 inches, while some 36 or 38 feet of lead, in strips, is so braided or looped in tiers that the liquid acts upon both sides of the plate or a surface of 72 or 76 feet. Before putting the plates into the battery-jar, the innumerable number of pockets on either side of the plate are filled with powdered oxide of lead, which after being pressed hard, the plates are placed into the acid in the jar and the current turned on simultaneously, thereby hardening the oxide of lead and making all plates solid and stiff. The idea is to get a plate with a large surface, which is obtained by this method of getting pockets on each side and so held together that should a strong resistance pass through the wires connected with the batteries, the plates would not buckle or the plugs fall out. The great trouble in the matter of build-

ing storage batteries has been to overcome the swelling of the plates, buckling and plugs coming out. Some time ago the first difficulty was overcome; and now Messrs. Bradbury and Stone have cleared away and do away with the last two troublesome points. The invention comes forward as the lightest battery of its kind and capability yet invented.

AN ELECTRIFIED TREE.—The residents of Wilmington (Del.) were recently very much agitated over the peculiar condition of a maple tree which stood in one of the public streets of that town. It was observed that whenever any one touched the tree, a slight electric shock seemed to be imparted to the person. The small boys after fooling with it awhile concluded to let it alone. The same disposition seemed to seize upon the older citizens when they came to investigate. The force of the shocks seemed to grow stronger from day to day until the tree became the wonder of the city and all the neighboring country. Finally some one of an investigating and scientific turn of mind came along, and on looking into its branches noticed that several insulated electric wires passed along, near and against some of its upper branches. This gentleman solved the mystery at once. The insulation of the wires had become softened by the frequent late rains, and by constant rubbing had brought the wires in direct contact with the green branches, which attracted a portion of the current and carried the same to the ground. Although the current thus conveyed was not sufficient to injure a person, yet it was quite sufficient to conjure up a seven-days' wonder for the usually quiet town of Wilmington.

AS THE MANCHESTER SHIP CANAL approaches completion, a number of similar projects are being brought forward to connect other interior cities with the coast.

GERMANY'S floating exhibition will visit 80 ports on its world's trip. It is a much grander affair than our "California on Wheels."

ELECTRICITY.

UNDERGROUND WIRES FOR SAN FRANCISCO.—John I. Sabin of the Pacific Bell Telephone Co. appeared before the Street Committee of the Supervisors for this city and urged that a favorable report be made on the petition of the corporation for a franchise to lay their wires underground. Mr. Sabin explained the system of laying the wires in conduits. He said it was proposed to adopt the system now in use in Chicago. The conduits would be large enough for telegraphic and telephonic purposes. They would be eight inches square, and would hold 600 wires. It may be interesting to know, in this connection, what is being done in New York in regard to putting the wires in that city underground. From an exchange we learn that the proportion of electric-light wires in New York city which have already been laid in the subways to those still remaining overhead is about as follows: The United States Illuminating Company, with about 600 miles of live and dead wire above ground, has 50 miles of subway wire, of which 15 miles are working. The Manhattan Company, with about 200 miles of wire above ground, has 26 miles of subway wire, of which 26 miles are working. The Mount Morris Company has about 30 miles of overhead wire, and 1.25 miles in subways, all working. The Brush Company, with about 600 miles of overhead wires, has 35 miles in subways and already uses 19 miles. The East River Company has about 200 miles of wire overhead, none underground. The Edison Company, incandescent and low tension, has every mile of its 232 miles of wire in subways. January 1st last there were 5196 miles of wire of all sorts in use in subways. On October 1st the subways held 9649 miles of wire in use.

BUYS A MINE.—George Westinghouse now requires so large a supply of copper in his various lines of business, particularly in his electrical works, that he has recently bought a valuable copper mine in Arizona, from which he proposes to obtain his own supply of copper. His electric company alone uses several million pounds of copper every year in the manufacture of electrical machinery, and by having its own mines the saving in the cost of copper will amount to a considerable sum each year. It is also intended to get beyond reach of the proposed Lake Superior copper syndicate. The mine will give employment to about 300 men.

EXTENT OF ELECTRICAL WIRES.—A French electrical journal estimates that the total length of the telegraph wires (including submarine cables) of the world in use at the present time exceeds 500,000 miles. Four-fifths of the land wires are in Europe and America. All the submarine cables together give a length of 89,050 miles.

THE ELECTRICAL INDUSTRY.—The Edison Machine Works at Schenectady, N. Y., already employ some 1300 men, and when the extensions are completed probably twice that number will be required. It is estimated that 250,000 persons in the United States are engaged in business depending solely on electricity.

Four telegraphic messages can now be transmitted over one wire at one time by using the quadruplex system.



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Passing Events.

The storms in the mountains have continued, greatly hindering mining operations and doing great damage. In most of the mining sections the shipment of ore to the mills is impossible, owing to the state of the roads, and very little work is being done. There have been no bullion shipments for weeks.

There has been daily expectation that the snow blockade on the Central Pacific would be broken, but it has lasted over two weeks, and it was not till Thursday night the trains were released from the snow. Immense damage has been done to railroad property in California, there having been slides, caves and washouts in all directions. Many bridges have been washed away on all the roads. It is not thought the Oregon road will be cleared for weeks.

We give this week considerable space to a review of mining operations for 1889. Much statistical information is placed before our readers which will be useful for reference.

Fears are felt for the safety of isolated miners in the mountain counties, owing to the severe storms. Already there are reports of the death of men who were snowed in and unable to get provisions or assistance.

The mines and mills at Grass Valley are gradually resuming work. The North Star has resumed milling operations, with 20 stamps, by means of water obtained from the Greenhorn ditch.

Mining in 1889.

Progress and Condition of the Industry.

The past year has been a prosperous one for the mining industry of the Pacific States and Territories. The output of bullion aggregates \$127,677,836, against \$114,341,592 in 1888. This is the largest annual product ever made. It must be remembered, however, that the lead and copper outputs have increased greatly of late years, especially in Montana, Idaho, Utah and Colorado.

The following is Wells, Fargo & Co.'s annual report of precious metals produced in the States and Territories west of the Missouri river (including British Columbia, and receipts by express from the west coast of Mexico) during 1889, which shows in the aggregate: Gold, \$32,974,643; silver, \$65,316,107; copper, \$14,793,763; lead, \$14,593,323. Total gross result, \$127,677,836. The "commercial" value at which the several metals named herein have been estimated, is: Silver, 94 cts. per oz.; copper, 10 cts. per lb.; and lead, \$3.80 per cwt.

STATES AND TERRITORIES.		Gold dust and bullion by express.	
California	\$9,330,044	\$330,000	
Nevada	3,082,053	100,000	
Idaho	634,633	20,000	
Utah	112,000	20,000	
Montana	3,204,600	20,000	
Colorado	4,600,000	20,000	
Arizona	15,275	20,000	
New Mexico	3,634,700	20,000	
British Columbia	381,607	20,000	
British Columbia (West Coast States)	3,021,501	20,000	
Mexico	3,401,818	20,000	
Total	\$29,055,483	\$2,004,000	
		Gold dust and bullion by other conveyances.	
California	\$684,478		
Nevada	6,832,634		
Idaho	3,202,702		
Utah	85,000		
Montana	7,641,600		
Colorado	16,016,928		
Arizona	1,764,792		
New Mexico	9,830,013		
British Columbia	19,314,847		
British Columbia (West Coast States)	6,108,291		
Mexico	3,362,846		
Total	\$74,141,717		
		Silver bullion by express.	
California	\$1,810,237		
Nevada	\$2,473,604		
Idaho	217,000		
Utah	217,000		
Montana	17,314,000		
Colorado	6,676,000		
Arizona	31,726,928		
New Mexico	9,830,013		
British Columbia	35,074,888		
British Columbia (West Coast States)	6,397,677		
Mexico	6,808,027		
Total	\$107,470,000		
		Ores and base bullion by freight.	
California	\$12,978,003		
Nevada	\$12,978,003		
Idaho	\$12,978,003		
Utah	\$12,978,003		
Montana	\$12,978,003		
Colorado	\$12,978,003		
Arizona	\$12,978,003		
New Mexico	\$12,978,003		
British Columbia	\$12,978,003		
British Columbia (West Coast States)	\$12,978,003		
Mexico	\$12,978,003		
Total	\$127,677,836		

Production as per W. F. & Co.'s estimate, including amounts from British Columbia and west coast of Mexico.		Product after deducting from British Columbia and west coast of Mexico.	
YEAR.	AMOUNT.	YEAR.	AMOUNT.
1871	\$58,294,000	1871	\$58,294,000
1872	62,236,000	1872	62,236,000
1873	72,058,000	1873	72,058,000
1874	74,401,045	1874	74,401,045
1875	80,585,067	1875	80,585,067
1876	90,587,178	1876	90,587,178
1877	98,424,704	1877	98,424,704
1878	104,701,000	1878	104,701,000
1879	117,400,000	1879	117,400,000
1880	127,677,836	1880	127,677,836
1881	138,000,000	1881	138,000,000
1882	148,000,000	1882	148,000,000
1883	158,000,000	1883	158,000,000
1884	168,000,000	1884	168,000,000
1885	178,000,000	1885	178,000,000
1886	188,000,000	1886	188,000,000
1887	198,000,000	1887	198,000,000
1888	208,000,000	1888	208,000,000
1889	218,000,000	1889	218,000,000
1890	228,000,000	1890	228,000,000

The exports of silver during the past year to Japan, China, the Straits, etc., have been as follows: From London, \$30,232,914; from San Francisco, \$13,422,338. Total, \$43,655,252, as against \$43,000,018 last year. Pounds sterling estimated at \$4.84.

As in former reports, allowance must be made for probable variations from exact figures, by reason of constantly increasing facilities for transporting bullion, ores and base metals from the mines outside of the express, and the difficulty of getting entirely reliable data from private sources.

Especially is such the case in the reports from Montana and Colorado. Statistics gathered in this way are liable to be exaggerated; but, with some modifications on this account, already made, the final general results reached may be expected as approximately correct.

The following showed gains in product last year over 1888: California, Oregon, Washington, Alaska, Idaho, Utah, Colorado, New Mexico, Arizona and Dakota; both Montana and Nevada show a decrease. Montana's figures for last year were \$32,376,000, and this year \$31,726,923. Idaho shows the most marked advance, having produced this year \$17,344,600, against \$5,685,000 in 1888. Her lead product increased greatly last year. California shows an increase from \$12,063,488 in 1888 to \$12,842,757 in 1889. Still the actual yield of metallic products is even greater for this State, since it yields a number of other substances not noted in the table. For instance, no other State produces quicksilver, and California last year turned out 25,650 flasks, valued at \$1,154,000. In addition, we mine chrome, actinomy, borax, coal, copper, gypsum, salt, and numerous other things. The petroleum interests of the State are also very large.

Mining Dividends.

It is rather difficult to obtain any reliable statistics of mining dividends even of the incorporated companies. Much of the incorporated dividend-paying concerns are now in Colorado, Montana, Michigan and Idaho, owned and operated by Eastern companies, and the records are not always reliable. In California much of the money comes from unincorporated companies, and the dividends are quietly divided without any advertising or publication, so it is impossible to get any record of them at all. In fact, such matters are kept quiet, as any ordinary business is. The mines, of which there are many owned by individuals, or a few persons, are in the same category, and no information is given as to the profits derived. It is, therefore, difficult to give any accurate figures regarding the profits of mining, especially in California, and the amounts appended are only those of incorporated companies. The statistician of the Bulletin has gone carefully over these figures and endeavored to obtain something reliable, but, as stated, they only refer to incorporated companies, the private mines being omitted entirely.

In Alaska there is only one mine that has paid a dividend—that is, one "company" mine. The Alaska N.-M. paid regular dividends of 25 cents a share through the year—\$300,000 for 1889. This mine has paid altogether in dividends \$650,000.

In Arizona, the Copper Queen mine paid one dividend of \$70,000 in 1889. This mine paid its first dividend in 1881, and the total to date is twenty-two dividends of \$1,410,000, of which \$210,000 is credited to the present management in the last two years. There were no dividends in 1885, 1886 or 1887.

Dividends.		Amount.	
Champion	3	\$30,000	
Delhi	5	50,000	
Derbec Blue Gravel	3	20,000	
Idaho Quartz	11	1,000	
Napa Co. Q.	5	50,000	
North Star	2	20,000	
Plumas Europa	2	123,016	
Quicksilver	2	103,107	
Young America	1	10,000	
Totals	35	\$702,163	

The Idaho dropped out one dividend because of a fire in the mine. The number of mines is about the same as in 1888, but the names are not the same, as the Plymouth Con, Sierra Buttes and Standard Con were dropped out last year and the Champion, Derbec Gravel, Napa and Young America added. The Sierra Buttes is reported as practically worked out. Forty of the sixty stamps of the Yuha mill company have been moved to another mine in Shasta county belonging to the same English corporation.

Of course there are hundreds of other mines in the State paying well, but they are owned by individuals and no record is made public. The Chippe Flat mine, for instance, yielded \$100,000 to the work of two men; and the Stonewall, in San Diego, belonging to Governor Waterman, pays \$20,000 a month, but these, like many others, are not mentioned in the lists of dividends.

The dividend record of the Colorado mines of 1889 is as follows:

Dividends.		Amount.	
American & Nettie	6	\$200,000	
Aspen M. & S.	3	320,000	
Boston & Colorado Smelting	3	150,000	
Calliope	5	50,000	
Colorado Central	4	55,000	
Compromise	1	126,000	
Dunkin	1	40,000	
Evening Star	2	25,000	
Hubert	1	5,000	
Iron Silver	1	100,000	
Ivanhoe	1	10,000	
Matchless	1	5,000	
Morning Star	2	50,000	
New California	1	20,522	
New Weston	3	187,500	
Poorman	1	15,000	
Puzzler	1	1,050	
Silver Cord	1	60,000	
Small Hopes	1	25,000	
Ward Con.	2	20,000	
Totals	40	\$1,606,072	

There are several mines in the above list that paid their first dividend last year. This was the case with the American and Nettie mine at Ouray. Its first dividend of \$30,000 was paid last July. The local paper speaks of it as one of the wonders of the gold belt. Another is the Compromise, which is reported to have paid a dividend of \$126,000 last July. The Ivanhoe paid its first dividend in June, Calliope and New California in August, and Puzzler in October. The Boston and Colorado Smelting is capitalized in the sum of \$1,000,000. It paid regular dividends of 2 1/2 per cent in March and July and an extra one of ten per cent in April. The Small Hopes was once the leading dividend mine of Colorado. The single dividend by that mine last year makes the total \$3,087,500 from the start. The following Colorado mines paid in 1888, but not in 1889: Eliphe, Leadville, Little Chief, Mary Murphy, Mascott and Swansea. But against these, six dropped out; nine were added.

The dividend mines of Dakota in 1889 were as follows:

Dividends.		Amount.	
Caledonia	10	\$30,000	
Hoe estate	12	187,500	
Monitor	3	37,500	
Totals	25	\$305,000	

The Caledonia mine resumed dividends in November, 1888, and paid for 12 consecutive months before stopping—the best the mine has ever done. In all it has paid \$138,000, and the stockholders believe there are other dividends to come. The Homestake is a veteran in the dividend line, having paid nearly \$450,000 to all.

The dividend record in Idaho Territory, so far as advised, is as follows:

Dividends.		Amount.	
Alma Con.	1	\$15,000	
Coeur d'Alene	4	70,000	
Deer Creek	1	10,000	
Granite	1	20,000	
Sierra Nevada Con.	1	20,000	
Totals	8	\$135,000	

The dividend of the Alma was paid last January. Two dividends of the same amount were paid previously. The Coeur d'Alene paid its first dividend of three cents per share last July. This was followed in August with one of four cents, and again in September, and then one of three cents in November, making \$70,000 in all. The Deer Creek paid its first dividend of 5 cents per share, or \$10,000, in 1888, and its second of the same amount last June, making \$20,000 in all. The Granite paid two dividends of \$10,000 in 1888, making \$20,000 in all. The Sierra Nevada Con. paid \$20,000 in 1888, and the same amount last year, or \$40,000 in all.

Following is a list of the dividends of the Michigan copper mines for 1889:

Dividends.		Amount.	
Atlantic	1	\$30,000	
Calumet and Hecla	3	1,500,000	
Central	1	40,000	
Franklin	1	50,000	
Oscoda	1	50,000	
Quincy	2	250,000	
Tamarack	4	640,000	
Totals	12	\$2,070,000	

These properties have paid better than any corresponding number of silver mines taken at random in any part of the country. The Calumet and Hecla has paid \$32,850,000. There is only one other mine in the history of this country that has a better record for dividends, and that is the Consolidated Virginia, which paid \$42,930,000 up to August, 1880. The next best record was that of the California, adjoining the former, which paid \$31,320,000 up to December, 1879. Those mines were subsequently consolidated, and under the new organization over \$3,000,000 more has been paid.

There are some lead mines in Missouri, but the only one credited with a dividend for 1889 is the Wehli City, which paid its first four monthly dividends of \$1100. The Pelican Eagle also paid two dividends of \$5000 each.

The dividend mines of Nevada for 1889 were as follows:

Dividends.		Amount.	
Con. Cal & Virgin's	10	\$554,000	
Confidence	1	34,000	
Cortez	1	160,000	
Jackson	1	5,000	
Mt. Diablo	2	40,000	
Navajo	3	30,000	
Pimlico	3	30,000	
Totals	21	\$1,143,960	

The Cortez paid its first and only dividend last May. It is incorporated in London. All the others have paid dividends in previous years. The record of dividends in 1880 by the Montana mines is annexed:

Dividends.		Amount.	
Allee	1	\$25,000	
Bozeman & Montana	5	625,000	
Cumbarland	1	15,000	
Granby	1	20,000	
Granite Mountain	12	2,400,000	
Hecla	12	180,000	
Iron Mountain	1	20,000	
Jay Gould	6	74,000	
Lexington	1	64,000	
Montana Limited	2	203,250	
Original	1	3,000	
Parrott	1	180,000	
Pyrenes	1	5,600	
Totals	45	\$3,714,250	

The Comberland paid its first dividend in December. The Granby M. and Smelting paid its first and only dividend in the early part of the year; Iron Mountain, its first and only dividend in December, and Pyrenes, in March. The Granite Mountain shows the largest dividend record of all the Montana mines, having paid \$7,800,000 to date.

The Illinois paid its second dividend of

\$20,000, last April. It paid \$25,000 in 1888 or previously. The Silver Mt. Co. of Las Vegas paid \$25,000 in 1888, and the same amount in June, 1889. Under its former name of Sierra Grande, previous to 1888, it paid \$860,000.

Following is the record of dividends of Utah mines in 1889:

	Dividends.	Amount.
Daily	12	\$150,000
Horn Silver	1	50,000
Mammoth	6	120,000
Ontario	12	200,000
Woodside	1	25,000
Totals	31	\$1,545,000

The Woodside paid its first and only dividend in October. The Horn Silver resumed dividends in December after a lapse of several years.

A summary of the above dividends, with comparative yearly totals, is annexed:

Mines.	Dividends.	Amount.
Alaska	1	12
Arizona	1	1
California	9	35
Colorado	29	49
Dakota	3	25
Idaho	5	8
Michigan	7	13
Missouri	2	6
Montana	13	45
Nevada	7	21
New Mexico	2	2
Utah	5	31
Totals	75	248
Total for 1888	68	255
Total for 1887	65	214
Total for 1886	58	203
Total for 1885	53	208
Total for 1884	64	230
Total for 1883	66	234
Total for 1882	64	331
Total for 1881	60	312

There was a falling off of \$1,300,000 in these dividends, last year, as compared with 1888. With this exception, the total is the largest since 1882 and is about 50 per cent larger than in 1885. The Michigan copper mines are responsible for over \$800,000 of the decrease last year, the Nevada mines for \$334,000 and the California mines for \$315,000. The Colorado mines added \$544,000 to the record for 1889, and the Utah mines \$102,000 above 1888.

CALIFORNIA.

With the mining industries of California the past has been a fairly good year, the hullion product of the State having come up to the recent average. That it would have been considerably larger but for the extreme drouth at one time, and the excess of water at another, we have reason to believe. Owing to a rather light snowfall on the mountains the preceding winter, followed by an early cessation of the spring rains, there ensued a general shortage of water before the summer was over, the drouth continuing until the autumn was more than half gone. As a consequence the active season of the gravel miners was much restricted, while the quartz-mills, dependent on water for their propulsive power, lost each from two to three months time, the only parties advantaged by the drouth being the river-bed miners, who, owing to the low stage of water, were enabled to commence operations much earlier than usual.

It might be thought that the early advent of the fall rains, followed by a heavy winter precipitation, would have compensated at least in part for the evils attendant on the drouth. But it did not so turn out. On the contrary, these heavy and protracted rains brought with them their own disadvantages and drawbacks. The floods developed, in fact, a crop of mischief less tolerable than that bred of the drouth. The prosperous working season of the river-bed miners was brought to a premature end, their claims being suddenly filled with debris and their plants swept away. The ditches, filled to repletion, were broken, their flow being so impeded with ice and snow that they could no longer supply the quartz-mills with water, forcing many of these once more to a standstill. The water making its way into the underground workings of the vein mines, ore extraction was in many instances greatly impeded or stopped altogether. The roads meantime became so bad that hauling was next to impossible. As a result, many of the mills were left short of ore, some also of fuel and other supplies; from all which it will be seen that gold mining in California, though an exceptionally safe business, is nevertheless subject to some of the vicissitudes and uncertainties incident to farming, fruit-growing and most other pursuits.

At the present writing the situation, as above described, remains little changed. The rain, which commenced falling about the middle of October, has since continued with so little interruption that it may be considered a prolonged storm. The intervals of fair weather since vouchsafed us have been short and few, amounting to much less than a month altogether. The streams are everywhere running hankfull, many of them overflowing their banks. The wagon-roads continue nearly impassable, those in the mountains owing to the unprecedented depth of the snow, those at the lower levels owing to the death of the mud.

The railroads in the Sierra Nevada and in the Siskiyou ranges are badly demoralized, portions of them being likely to so remain for some time. This has rendered transportation to and from

many of the mining camps difficult and costly.

The causes which have so interfered with vein mining have in many localities proved equally detrimental to placer operations. The hydraulic miners have as yet been able to do very little. The drifters have not, of course, suffered much from the excess of water, while to the ground-sloppers and others, who depend on free water and plenty of it for their success, it has proved a very godsend, these men having everywhere below the heavy snow belt been driving an active and thrifty business the whole winter through.

General Progress and Improvement Made.

While the past year has not been marked by any notable events in the mining world or seen the field of active operations much extended, it has, at the same time, brought with it a fair amount of improvement of one kind and another. The introduction of the electric motor has made encouraging headway. The practice of ore concentration has become more common, it having been adopted by many companies during the year and generally with gratifying results. Water has in numerous instances been substituted for steam-power or made to supplement the latter. The year has been prolific of inventions designed to cheapen or perfect mining implements, mechanisms and processes, many patents for securing these improvements having meantime been taken out. Great gains steadily inure to the mining industry through the introduction of these various devices. The tendency, as for some time past, is still toward the working of lower grade ores, what has been accomplished in this direction having been largely due to the various improvements above mentioned.

As to the work performed of late by the State Mining Bureau, this institution has been brought into a condition of great proficiency and usefulness. The year seems to have awakened among our miners something of the ancient spirit of exploration, starting many of them out on prospecting expeditions in the mountains. Mining in several of the old and partially deserted districts has also undergone some revival, causing there a slight increase in the hullion output and population. Aggregated, the improvements above mentioned denote no small amount of gains effected during the past year.

Of all our several branches of gold-mining, none have been so well prospered of late as

Drift Operations.

These never being exposed to suffer much from either an excess or lack of water. As the precipitation ever so great, it cannot much impede this class of operations, while the miner rarely ever finds himself left without water enough to wash the gravel extracted during the year. Since the partial closing of the hydraulic mines, increased attention has been turned to this branch of the business, imparting to it an activity that it would not have otherwise experienced. The tier of counties extending from El Dorado to Plumas continues the site of the larger drift operations, not much being done in this line outside of these. While the old mines here have kept up and in some instances increased their usual output, a good deal of new drift ground along this belt has within the past 12 months been opened, it being the intention of some of these recently-formed companies to engage in this business on a very extensive scale.

Hydraulic Mining.

While gravel-washing by the hydraulic method has been effectually suppressed in the more central mining counties, formerly its largest field, it still goes on uninterrupted in the northwesterly part of the State, Trinity and Siskiyou constituting now our leading hydraulic counties. In ordinary winters this style of gravel-washing is not apt to suffer much interruption by reason of snow, ice or floods. These have, however, the present winter proved to the business a serious detriment, the snow having in many localities reached a depth that not only interfered with piling, but precluded it altogether. With the warmer weather now at hand, most of the companies will be able to get to work, the prospect being that the incoming season will prove to this class of miners a very prosperous one, as the water supply promises to be larger than ever before. While the working season of

The River-Bed Miners

Terminated in the premature and abrupt manner mentioned, their earnings last year came fully up to the average, as they got to work much earlier than usual. While this method of gold-gathering is practiced along most of the larger streams in the mining regions of California, the basiest operations are carried on in the heads of the Scott, Klamath and Salmon rivers, in Siskiyou county. Although subject to many contingencies, this branch of mining pays well, and sometimes very largely when the conditions prove favorable. It can hardly be called a growing industry, large sections of the river-beds being already worked out and it requiring many years for these to become sufficiently enriched to warrant their being worked over again, this process of restoration being especially slow in districts where the hydraulic mines have been closed down.

Quartz Mining.

The mining of gold quartz in California still continues to be that branch which produces the

most gold. Of late years much more attention has been paid to the economies of vein mining, with good results. It is now possible to work ores of lower grade than could be touched at all ten years ago. The era of big salaries, "top-heavy" companies and extravagance has passed by, and in its stead is one of hard work, economy and business principles.

While there have been many minor inventions in the line of saving gold from quartz, there have been no very radical changes of late. There has been a tendency to adopt the rotary or roller-mills at smaller mines instead of stamps, mainly because these appliances in their various forms are less expensive than the stamps, and they answer their purpose very well indeed.

As we have each week reported progress from the various districts of the State, it is unnecessary to review their operations in any detail. The region around Grass Valley, Nevada county, continues to keep the lead in quartz operations. More attention has been paid to quartz recently in the northern counties, particularly in Shasta, where some large operations are being conducted.

Many old mines have within the past year or two been reopened and reworked. There are still many hundreds which were operated at a time when we knew less than we do now about gold-quartz mining, and which would pay now. Gradually these mines will be reopened and do their share toward increasing the hullion product. In fact, quartz-mining is in as good condition to-day in California as it ever was, and is a paying industry.

Quicksilver.

There is one mineral product yielded by California not made elsewhere in the United States, and that is quicksilver, though the State is not credited with this on the hullion product tables. Last year the value of this California quicksilver was \$1,544,000. Through the courtesy of Mr. J. B. Randol, of the New Almaden mine, we are enabled to give the following facts concerning our quicksilver industry.

The following table shows the production of the several mines for two years past:

Mines.	1888.	1889.
New Almaden	18,000	13,100
Elm	950	950
Napa Consolidated	4,005	4,500
Great Western	625	550
Sulphur Bank	2,164	2,150
New Idria	1,320	1,000
Great Eastern	1,151	1,350
Redington	125	800
Bradford Consolidated	3,545	1,700
Various	902	500
Total flasks	33,250	25,650*
Lowest price per flask	\$37 00	\$40 00
Highest price per flask	48 00	50 00
Average per flask	42 60	45 00

Total value at average price.....\$1,415,000 \$1,154,000.

*The total production for 1889 is a near approximation.

The monthly production and highest and lowest prices prevailing during the past year have been as follows:

Month.	Monthly production.	Highest price per flask.	Lowest price per flask.
January	2,270	\$43 00	\$41 50
February	1,740	42 00	41 50
March	2,125	41 50	40 00
April	2,134	41 00	40 00
May	1,340	45 00	41 00
June	2,225	50 00	46 50
July	2,021	47 00	46 00
August	2,000	47 50	46 00
September	2,030	47 50	46 00
October	2,440	47 00	46 50
November	2,460	48 00	46 00
December	2,305*	48 00	47 00

*December product estimated.

The total production for 1889, 25,650 flasks, compared with the previous year, shows a decrease of 7600 flasks, and is the smallest quantity in any year since 1873, when the production was 27,642 flasks.

New Almaden's production shows a loss of 4900 flasks and is its lowest yield since 1874, when its production was 9034 flasks.

Napa Consolidated retains its position of second highest producer and increased its output to 4500 flasks, a gain of 435 flasks.

Elm was dropped off the list. Bradford, the third in rank last year, produced only 1700 flasks, a loss of 2145 flasks. Great Western produced 550 flasks, a loss of 75 flasks. Sulphur Bank also shows a slight decrease, 2150 against 2164. New Idria had a like misfortune, 1000 against 1320.

Great Eastern, an unimportant increase, 1350 against 1320. Redington, in a last expiring effort, turned out 800 against 125, and various odds and ends of mines gathered 500 against 902 in 1888.

This decrease all along the line (except Napa Consolidated) emphasizes the poverty of the mines; the higher price of quicksilver has failed to arrest the decline in production and the future outlook is far from hopeful.

Still higher prices must prevail in 1890; and this industry must be protected by a liberal duty—at least ten cents per pound—otherwise we may look for a further decline in production, to a point where the output will be insufficient to pay costs; and then—extinction.

The Oil Industry.

Mr. Louis Blankenhorn has written for the Los Angeles Express an account of the growth of the oil industry in Southern California, from which we make the following extracts:

The history of the oil development of California dates substantially from 1862. Companies were formed, machinery purchased and much

money spent, only to show that Southern California presented, as yet, the only field where petroleum could be sought in merchantable quantities, and even here was destined to wait many years for the realization of success. Some oil was sought and found in Los Angeles and Ventura counties, but the year 1875, or about, brought railroad facilities, markets, men and material, and had accumulated experience which gave a new impetus to the quest for the oil which, there was no doubt, existed, according to all geological and practical expert opinion, beneath our upturned and distorted surface strata. The Pico canyon field was then opened, and has seen some 40 wells drilled since, most of which have produced a fine oil and whose production has aggregated many hundred thousands of barrels and added millions of wealth to our State and county. This oil has been used chiefly for reneig oil on naphtha, lubricating and gas oils. This field continues to produce largely and drilling goes on. The companies formerly owning the oil-field now merged into the Pacific Coast Oil Company, formerly operated the refinery at Newhall, but now find it more convenient to transport the crude to the great oil refinery at Alameda Point.

The Puente oil-fields of Los Angeles county are about 30 miles from Los Angeles and five miles from the Southern Pacific railroad, to which the oil is transported by a pipeline. The development dates from previous to 1882. The Puente Co. have drilled 13 wells, and the production has aggregated about 3000 barrels per month for some time past. The Puente Company market their oil in this city, and have aided materially in the support of our industries, and the wells have no doubt proven a very profitable investment to the fortunate owners, Messrs. Lacy & Rowland. During 15 years past a score or more of other wells have been drilled for oil within a radius of 25 miles around Los Angeles in all directions, some of which are producing small quantities of oil, but most of which, while passing through oil-bearing strata, failed to produce in profitable quantity, or have met with difficulties that have caused abandonment of the wells. Some gas has also been found. All signs point to the hope and faith that oil and gas will be found in large quantities in Los Angeles county, when accumulated nerve and capital shall seek it at sufficient depths.

By far the largest producing territory, however, in California is that now developed and controlled by the Hardison & Stewart Co., the Seape Oil Co., and the Mission Transfer Co., in Ventura county.

The companies referred to are substantially one interest, and the magnitude of their operations indicates the value of the business to Southern California, and leads to the reasonable expectation of cheap and abundant fuel for all new and present manufacturing industries and other purposes where fuel enters as a factor in the problem.

The managing head of the companies is W. L. Hardison of Santa Paula. With him are associated in the directory Lyman Stewart and Dan McFarland of Los Angeles, Hon. Thomas R. Bard of Hueneme and others.

The purchase or lease of the many thousands of acres of oil territory controlled by them; the drilling of over 70 wells; the laying of over 125 miles of pipe lines, connecting the wells with railroad and seaboard shipping facilities, and other properties and plant, now represent an investment in cash of over three-quarters of a million of dollars. Its tankage represents a storage capacity of nearly 100,000 barrels, and 52 tank-cars of large capacity are in use to transport its products to market. The territory covered by these companies reaches from the eastern edge of Ventura county to the San Buenaventura river. The various fields are known as Torrey Canyon, Seape, Santa Paula, Adams, Wheeler and Aliso Canyons and the Ojai Valley. Five sets of tools are kept drilling new wells constantly, and many new wells are finished each year. Besides the work of these companies, however, there are a number of other corporate or individual operators who are now drilling and exploiting in the same territory, and with the vast fields and markets open and ready to absorb a large increase in production of fuel petroleum, there can be no monopoly of production for a long time to come. The Mission Transfer Co. has within a year finished a large refinery at Santa Paula, equipped with the latest and most improved facilities for refining oil, and has a present capacity of distilling daily 300 barrels of crude, which can easily be doubled when necessary. Its products are now illuminating and lubricating oils of fine quality, naphtha (gasoline) and asphaltum, all of which find a market at hand.

ARIZONA.

Arizona has a very large extent of mineral ground yet undeveloped; in fact there are large tracts still unprospected. The territory has not been as fortunate as other regions in obtaining the aid of capital for its mines. Reduction works are needed in many places and money is wanted to open and outfit mines. Therefore mining affairs have not made the advancement proportionate to the worth of the properties. We have from week to week chronicled the progress of the mines in the various camps, and elsewhere in this issue of the PRESS give the estimate of the past year's hullion product of the Territory. What was the principal camp of the Territory is not prosperous just

now, as Tombstone, like other places, needs outside capital to aid it.

Arizona ranks second to Montana among the Pacific States and Territories in copper production. The *Engineering and Mining Journal* gives the copper production of Arizona for the year 1889 at 31,600,000 pounds, divided among the several companies as follows:

Copper Queen Co.	9,024,000
Arizona Copper Co.	7,600,000
Old Dominion Co.	6,009,230
Detroit Co.	2,385,000
Holbrook and Cave Co.	2,100,000
United Verde Co.	438,780
Other mines	438,780

The *Globe Silver Belt* says: The estimate of the Old Dominion Co.'s production is slightly excessive, and the figures for other mines may not be exactly correct, but approximately they are right and show a very prosperous year for the copper industry of our Territory. While the Old Dominion Copper Co. of Globe ranks third in production, yet its profits for the year are probably larger than any other Arizona company can show, as was the case for the previous year. Despite the difficulty and great expense of getting coke and supplies, and shipping copper, by reason of remoteness from railroads, it has been proven that the Globe mine can produce copper cheaper than any other mine in the Territory, and there is no doubt but that it is to-day the most valuable copper property in Arizona.

A correspondent of the *Lordsburg Liberal* has this to say concerning the Olfitt district: This camp from the following showing, per shipment for this year, 1889, modestly asks if it is not entitled to be dubbed as a producer without a peer in the territory. To wit: Arizona copper company, copper bullion, 7,253,855 pounds. The Detroit copper company, 5,041,820 pounds; copper ores shipped, 523,450 pounds. Silver and gold ores, 50,940 pounds. From this showing is it any wonder that foreign capital has fastened itself so permanently? American capitalists it would seem from this have not the brain to direct nor the grit to inspire it to a healthy and safe investment. The mineral lands hereabout are slowly, surely and cheaply being bought up by the shrewd, far-seeing Scotchman. The American, an intelligent prospector, after failing to induce his own kind who have capital, to take hold, has been forced to yield to the inevitable and sell his discovery and labor for a mere mess of beans. Copper can be safely quoted on an average for the year 1889 at 10 cents per pound. At that market price the bullion alone shipped from here would yield \$1,229,567.50. It is also safe to say that \$40,000 per month, in connection with the above-order system that prevails, would cover every item of expense; if that amount did not do it is a sure thing that \$50,000 would, and would leave the profit of \$629,577.50 for the copper production alone. The figures as given above are correct, and it does seem with our hoisted idle capital a few, at least, Americans would see the point.

The mining interests have been unusually active during the year, says the *Prescott Journal-Miner*. A greater number of sales have been consummated, and a larger amount expended in development work and improvements in the way of building mills, etc., than during any previous year in the history of the country. Of the more important sales that have been made during the year, to say nothing of the numerous transfers of small claims, may be mentioned the Dixie group on Lynx creek, the Mockingbird on Cherry creek, the Dan O'Boyle mine on the Hassayampa, the Silver King and adjoining group on Groom creek, the Black Horse on the Hassayampa, the Ryland mine at Minnehaha, the Del Pasco group of mines in the Bradshaw mountains, the Senator mine on the Hassayampa, the Boggs and Hackberry on Big Bug, and the Harrison mine at Placerville.

The year has also witnessed the building of a mill at the Congress mine at a cost of \$60,000, together with other improvements costing fully \$40,000 more; the Dixie mill costing \$20,000; the Quartz Mountain mill costing the same; the Wire Gold mill costing \$10,000; and the Cherry Creek mill costing from \$10,000 to \$20,000, and from \$5,000 to \$10,000 spent in putting the Eltsa mill in repair. The Oro Bella, Crowned King and Ryland mills, although built in 1888, were not started until the early part of 1889, and have all proven successful and are now ranged among the paying enterprises of the country. The Copper Basin smelter is also among the enterprises started up during 1889, while the United Verde smelter, started some four or five years ago, has just added another year to its successful operation.

For the year will reach very close to \$1,500,000, or an increase of about one-half over that of 1888. The largest producers for 1889 have been the same as during 1888—the Congress and Hillside, the former having more than doubled its product for 1888. It is now, since starting the mill, producing in ore and concentrates over \$40,000 per month, or on a yearly basis of \$500,000. The producing power of the mine is capable of even doubling this product, with increased facilities for working and shipping it.

The new service dam of the Walnut Grove Water-Storage Company on the Hassayampa, constructed during the year at an expense of upward of \$100,000, has also been among the additions made to the facilities for producing precious metals. This is intended to furnish water to gold-bearing gravel-beds along the creek some miles below, and will be in operation early in the year 1890.

COLORADO.

We have given elsewhere the estimate of Wells, Fargo & Co. concerning the bullion product of Colorado. The *Denver Republican*, however, puts it at \$29,935,477, and says the information is from the smelters, ore-buyers and mint. The amount obtained from each source was as follows:

From smelters	\$28,000,445
Shipped out of the State	750,000
Deposited in the mint	1,185,032
Total	\$29,935,477

The *Republican* says: This is not, however, all of the production. Some gold was sent out of the State not appearing in the figures given by those quoted, and some was sold to manfacturers. The amounts so disposed of aggregate more than is usually supposed, but as any estimate would be only a guess, it is omitted from the calculation. It will certainly be enough to swell the figures given to over \$30,000,000. This is fully \$2,000,000 more than has been produced during any previous year.

The silver is calculated at 93 cents per ounce. The United States authorities, in their estimates, calculate silver at its coinage value of \$1.29 per ounce, thus making each year the value of the production more than the miner or ore-buyer or smelter received for it. As an illustration, the value of Colorado's product for 1888 was reported by the director of the mint to be \$36,000,000, which was fully \$8,000,000 above its commercial value.

Production has been curtailed considerably by the low prices of lead and silver. The same fact is true of the production of the last three years, but as prices ruled lower last year than ever before, the effect was felt more seriously, and production probably curtailed more than ever. The Henrietta and Maid, at Leadville, the heaviest tonnage-producer in the State, whose ore is an argentiferous lead ore, turned out as little as possible to keep running during the most of the year, and closed down entirely in November. The two heaviest producers at Aspen also closed down for December, owing to unsatisfactory prices. Ordinarily these things would have militated against even an average production, but their effect was more than offset by the increase from other sources.

New discoveries have added their quota to the total yield, but the amount derived from them has not been sufficient to swell the product as much as it has been expected. The additions are due to increased activity in the older mines, and all parts of the State share the honor. The San Juan country has added about one-sixth to its product, a fair part of which came from the new discoveries in the gold belt at Ouray. Next to that region the counties of Clear Creek and Gilpin show the largest proportionate gain. It is peculiarly gratifying to the miner who has faith in his occupation that the oldest mining region in the State, where the first discoveries were made and where mining has been continuously conducted for 30 years, should show the largest proportionate increase in the past year.

Both Lode and Placer Mining.

The prosperity has affected both lode and placer mining, though the latter was less than it would have been had water not been scarce. More placers were operated last year than ever before, and results were favorable. Especially was this the case on the San Miguel, where the Keystone, San Miguel and U. S. gold placers were operated, the yield having varied from 25 cents to \$1 per cubic yard.

All indications point to an increase during the present year fully as great as that which characterized last. It seems as though the march was onward, and that mining in Colorado is but in its infancy.

Product of the Various Smelters.

The production of the different smelting establishments in the State, in detail, was as follows:

GLOBE SMELTING AND REFINING CO.	
3,319,547 ounces silver	\$3,153,570 41
15,792 57 ounces gold	315,851 40
19,637,815 pounds lead	765,874 79
329,502 pounds copper	46,150 68
Total	\$4,235,472 28

LOCALITY.	Gold, ozs.	Silver, ozs.	Lead, lbs.	Copper, lbs.
Colorado	11,657,922	1,912,777 9	11,360,534	51,171
Utah	3,593 95	1,183,163 5	5,989,751	243,691
Montana	9,403	9,535 1	15,231	
Idaho	535 36	98,369 7	1,938,810	
New Mexico	41 88	50,475 0	166,100	
Mexico	5 26	54,004 4	117,380	
Canada		6,222 2		
Totals	15,792 57	\$3,153,570 41	19,637,815	329,502

Closed one month for rebuilding and enlarging works.

BOSTON & COLORADO SMELTING CO., DENVER.			
LOCALITY.	Gold.	Silver.	Copper.
Colorado	\$605,941 05	\$2,002,193 10	\$ 91,120 00
Other States and Territories	205,645 83	1,123,480 00	264,880 00
Totals	\$811,586 88	\$3,125,673 10	\$ 516,000 00
Total for Colorado		2,699,254 15	
Total for other States and Territories		1,600,000 83	
Grand Total		\$4,299,254 98	

Of the shipments, Gilpin county produced:	
Gold	\$945,657 29
Silver	149,093 96
Copper	48,534 00
Total	\$1,142,285 25

Of the shipments, Lake county produced:

Gold	\$ 4,717 30
Silver	407,117 50
Total	\$411,834 80
PHILADELPHIA SMELTING AND REFINING CO., PUEBLO.	
Ounces silver	2,318,009
Ounces gold	19,111
Pounds lead	16,392,520
ARKANSAS VALLEY SMELTING CO., LEADVILLE.	
Ounces silver	2,204,208
Ounces gold	5,677
Pounds lead	18,475,000
MANVILLE SMELTER, LEADVILLE.	
Ounces silver	525,558
Ounces gold	1,859
Pounds lead	5,602,909
HARRISON REDUCTION WORKS, LEADVILLE.	
Ounces silver	1,137,106
Ounces gold	5,210
Pounds lead	3,865,000
AMERICAN MINING AND SMELTING CO., LEADVILLE.	
Ounces silver	2,312,499
Ounces gold	2,836
Pounds lead	21,346,307
SAN JUAN SMELTING AND MINING CO., DURANGO.	
Ounces silver	538,775
Ounces gold	4,490
Pounds lead	2,680,768
Pounds copper	256,000
PUEBLO SMELTING AND REFINING CO., PUEBLO.	

METALS.		Production from ore mined outside of Colorado.		Total for the year.	
	Produced from Ore, Jan. 1 to Dec. 15, 1889.	Estimated production from Ore, Jan. 1 to Dec. 15, 1890.	Produced from Ore, Jan. 1 to Dec. 15, 1889.	Estimated production from Ore, Jan. 1 to Dec. 15, 1890.	Produced from Ore, Jan. 1 to Dec. 15, 1889.
Ounces gold	3,497	300	426	4,223	
Ounces silver	1,025,456	55,000	91,889	1,182,345	
Pounds lead	3,780,392	355,000	1,173,408	5,308,000	
Pounds copper	1,188,321	125,000	95,247	1,408,568	

Number of blast furnaces in operation Dec. 19, 1888, 6; number of blast furnaces in operation Dec. 19, 1889, 8. Works operated during 1889 at about one-fifth of their full capacity.

Value of gold, silver, lead and copper produced in 1888, \$2,921,010.01.

Value of gold, silver, lead and copper produced in 1889, \$1,586,325 30.

OMAHA AND GRANT SMELTING AND REFINING CO., DENVER.	
Copper—717,014 pounds, valued at 12 cents per pound	\$ 80,149 68
Lead—33,108,341 pounds, valued at \$3.80 per cwt.	1,272,746 95
Silver—6,096,600 ozs., valued at 93c. per oz.	5,669,833 00
Gold—82,001.84 ozs., valued at \$20.67 per oz.	1,694,978 03
Total	\$8,728,712 66

The sources of the above metals were as follows:

COUNTRIES.		Tons.		Pounds Lead.		Ounces Silver.		Ounces Gold.	
	Total Colorado.								
Chloride	10,970	1,255,408	13,601	3,782,728	1,092,203	12,433 73	11,290 84	\$ 412 691 80	
Clear Creek	16,074	1,651,948	18,074	5,003,430	1,233,203	19,571 11	17,131 39	\$ 713,018 79	
Gilpin	35,029	6,003,430	38,029	11,713 39	770,023	8,917 45	9,242 04	\$ 371,201 06	
Lake	2,908	8,917 45	3,914	11,713 39	38,029	11,713 39	11,713 39	\$ 472,424 04	
Ouray	21,119	3,451,445	21,119	6,003,430	1,092,203	12,433 73	11,290 84	\$ 412 691 80	
Park	21,119	3,451,445	21,119	6,003,430	1,092,203	12,433 73	11,290 84	\$ 412 691 80	
San Miguel	21,119	3,451,445	21,119	6,003,430	1,092,203	12,433 73	11,290 84	\$ 412 691 80	
St. Elmo	21,119	3,451,445	21,119	6,003,430	1,092,203	12,433 73	11,290 84	\$ 412 691 80	
Union	21,119	3,451,445	21,119	6,003,430	1,092,203	12,433 73	11,290 84	\$ 412 691 80	
Other States and Territories	13,279	1,826,515	13,279	3,782,728	1,092,203	12,433 73	11,290 84	\$ 412 691 80	
Mexico	2,800	3,782,728	2,800	6,003,430	1,092,203	12,433 73	11,290 84	\$ 412 691 80	
Grand Total	160,220	\$3,403,341	160,220	\$3,403,341	6,003,430	\$2,001 84	\$1,290 712 06		

As compared with 1888:

Increase in copper, pounds	274,898
Increase in silver, ounces	871,007
Increase in lead, ounces	18,013 02
Increase in gold, ounces	5,854,467
Prices 1888.	
Copper	15c per lb.
Lead	\$4.40 per cwt.
Silver	93c per oz.
Gold	\$20.67 per oz.
Prices 1889.	
Copper	12c per lb.
Lead	\$3.80 per cwt.
Silver	93c per oz.
Gold	\$20.67 per oz.

Average monthly pay-roll, \$33,500; number of men employed, 550.

The total tons of ore, lime rock, charcoal and coal consumed during the year was 235,230.

The Leadville *Herald-Democrat* in speaking of the camp of Leadville says: The bullion product of the Leadville smelters during 1889 amounts to \$8,299,854 65; the total amount of ore shipped to the valley smelters during 1889 amounts to \$5,384,197 10; the total making the entire output from the Leadville district for the year past \$13,684,051 75. This is an increase of \$1,552,845 27 over that of 1888.

The total production of the camp from 1860 to 1890 amounts to \$153,405,195.

Our calculations of the output for 1889 from all sources have been made with great care, and special pains were taken to avoid the slightest exaggeration of reports received. The result reached, \$13,684,051, will go to the world as the performance of our mines in the twelfth year

since their discovery, and those who are most familiar with the sources of our information will agree that our figures are under rather than above the actual. We have chosen to omit altogether the production of our chief gold property—the Antioch—since the actual returns could not be obtained from the management, and it is more than probable that this and other omissions of mine yields, not readily obtainable, would, if added to our aggregate, swell the grand total to \$14,000,000. Only in four years since 1878 has the production of the district reached this figure—1880, 1882, 1883 and 1886—when we received very much higher prices for both silver and lead. Indeed, had values been equal to those of 1882 the output of the year just closed would exceed that of any year since mineral was discovered here. As it is, the total production exceeds that of 1879, the year of the boom, by \$3,350,351. It exceeds that of 1881 by \$536,594; it exceeds that of 1885 by \$1,326,784; it exceeds that of 1887 by \$1,611,084; it exceeds that of 1888 by \$1,854,241; it is exceeded by that of 1880 by \$1,341,078; it is exceeded by that of 1882 by \$3,443,351; it is exceeded by that of 1883 by \$1,854,395, and by that of 1886 by \$66,782, an excess so small that the product of the Antioch, if added, would more than overcome it. The output of 1889 exceeds the average output of 11 years by \$256,301.

The total output of the Leadville district now aggregates \$153,405,155.

Leadville's Smelters.

This continuous action on the part of the smelters has resulted in the treating of a much greater amount of ore than during the previous year, and the consequent production of a great deal more bullion, containing a great deal more silver and lead than during that length of time—the Arkansas Valley Smelting Company coming to the front with some 9300 tons of bullion, carrying over 2,200,000 ounces of silver and over 5500 ounces of gold, in addition to which this smelter produced from its matte 140 tons of bullion with nearly 115,000 more ounces of silver and some little gold.

The American Smelting Co. produced over 10,500 tons of bullion, over 2,000,000 ounces of silver, 21,000,000 pounds of lead, and over 2500 ounces of gold; while the Hanson Reduction Works sent out nearly 4500 tons of bullion, over 1,000,000 ounces of silver and 5000 ounces of gold.

The Manville, with its three stacks, did very well indeed, and kept up its reputation for close smelting by the production of some 5,500,000 pounds of lead, over 500,000 ounces of silver, and about 1800 ounces of gold, each and every one of the smelters greatly exceeding their product for the previous year.

In the early part of 1889 a company called the Colorado Gold, Silver and Lead Recovery Co. went to work with a process of their own on the slag dumps of the La Plata smelter, and for a very short time succeeded fairly well, making a matte which netted them about \$60 per ton, but very shortly for some reason gave up the attempt.

The roasting furnaces of the Arkansas Valley smelter have a capacity of about 60 tons of sulphide ore per day, and have proven a valuable aid to the smelting of some of the more refractory ores of the camp, and the number of such furnaces will undoubtedly be added to ere long.

The Harrison Reduction Works, not having these furnaces, devotes its attention principally to the lead carbonate and dry silicious ores.

The concentrating mills have all been running full time for the greater part of the year.

During the year 1888 there were shipped from Aspen 90,170 tons of ore of an estimated value of \$5,229,860. The value per ton was figured at \$58, but there has been reason to believe that the figure was too low, and it would probably be fair to put the value of the output of the year 1889 at a considerably higher figure.

The product during 1889 amounted to 120,560 tons, which, at an average value of \$60 per ton, would make the gross output of the camp \$7,233,600, an increase of more than \$2,000,000 over the year before.

The problem of getting at the exact value of the product is complicated by reason of the fact that all the ore is shipped to outside smelters and through many channels. The samplers handle part of it, but much is shipped direct. Some mine-owners object to giving their products, and others only keep a record of net values. The minimum value of pay ore in the district is about \$30 per ton, and the product varies all the way from that figure to several hundred, some shipments going into the thousands. It is safe to calculate that the average value will not fall below \$60, while it might go as high as \$65, or even higher.

There have been some shipments of very high-grade mineral during the year, but the returns from such are never made public, and information concerning them is extremely indefinite. While the minimum value can be quite definitely known, the other end of the scale is always an uncertain quantity.

The suspension of shipments from the Aspen and Compromise mines, during the months of November and December, reduced the year's yield about 10,000 tons, otherwise the product would have passed beyond the \$5,000,000 mark.

The greatest need that Aspen experiences is a market for her low-grade ores. If there were works in the valley that could handle ore run-

ning as low as 15 ounces or 20 ounces, the tonnage of the camp would soon be more than doubled. The present year promises to be highly prosperous because of the many new discoveries of high-grade mineral, but if it should also bring to the district the needed facilities for working the poorer classes of ore, general business would soon be doubled, and mining development would be still further stimulated.

Colorado is rich in both iron and coal. The coal production in 1889 was 2,500,000 tons. The average price paid to miners throughout the State is 71 cents per ton of 2000 pounds for mining and timbering their workings. The area of coal-bearing sections in the State is now said to exceed, somewhat, 26,000,000 acres. The coke production for last year, from Crested Butte and El Moro ovens, was 116,500. There are also about 25 petroleum wells in the State, which are yielding about 1300 barrels per day.

It is impossible in the space at our disposal to give any consideration to the developments or prospects of individual mines in Colorado, and we must content ourselves with the brief summary of results presented.

IDAHO.

Idaho has come to the front the past year and wrested the third place among the bullion-producing from California, taking her position mainly by reason of the value of some millions of lead. The importation of cheap lead ores, however, acted to the detriment of Idaho, and the fire at Wood River was bad for the mining industry of that region. The Wood River country, however, has much that is encouraging in its mines, some of which are shipping ore and others being developed. At Bellevue the Minnie Moore and Queen of the Hills are both shipping. At Yankee Fork the Dickens-Caster property lay idle part of the time last year, though when running the bullion product was \$30,000 a month. The Washington ran its small mill all the year. The Rams-horn Co. operated its plant at Bay Horse only part of the year. The mines are in excellent condition, as is all the plant, consisting of a concentrating mill and smelter. The machinery is operated by water under 375 feet pressure on a Pelton wheel. During the season the company shipped about 405 tons of bullion, carrying 206 354 ounces silver, 200 tons of speiss and matte, carrying 12,000 ounces silver and about 250 tons of high-grade ore carrying about 50,000 ounces silver. To make this bullion, matte and speiss required 195,000 bushels of charcoal, made in permanent kilns near the smelter. The shipments of these smaller mines aggregate about 150 tons, equal to about 30,000 ounces of silver, making the product of the camp, outside of the mines owned by the Clayton Co., aggregate nearly if not quite 300,000 ounces silver.

In Sea Foam district considerable progress has been made, though the distance from an ore market has hindered development. At Nicholia, the Viola Co. ran their works three months and turned out 1500 tons of bullion. Rocky Bar mines are being developed and a number of small mines keep the custom mill at work. The principal mining camps in and around Silver City did well with several mills running. Silver City shipped away \$265,000 last year. The De Lamar group at Wagon-town turned out \$410,000 in 1889.

The U. S. Assay Office at Boise City handled last year \$622,773 in gold and \$70,924 in silver.

Mr. J. W. Canningham, assayer in charge, in transmitting this table of gold and silver, says: "The placer mines of Idaho have yielded scarcely half the product of a good season, owing to the lack of sufficient water to work them. Many of the largest claims were not worked at all. You are thoroughly acquainted with these conditions, however, and will be able to see under what disadvantages so good a showing has been made."

"Deposits during the last few months came from Portland, Baker City, Pendleton, Canyon City and Malheur, Oregon, and from Lewiston, Salmon City and other distant points in Idaho, besides the many places in the vicinity of the office. This shows how large a section is accommodated by this office. The Government maintains the office at considerable expense, simply for the convenience of the miners. Exactly the same value is received for bullion deposited here as at the mint at Philadelphia or San Francisco, the depositor getting quicker returns and saving a great deal in the difference in express charges."

The Cœur d'Alene mines have done well the past year. The *Wardner News* says: "Vast as have been the achievements of the past, they are as nothing compared with the possibilities of the future, of which the most vivid imagination can scarcely yet conceive. The healthy condition of affairs and approaching tide of development warrants the expectation of a marked enhancement of values. Although our country has but passed the first stages of its existence, it already occupies an important place in the history of mining, if great achievements count for aught. Gradually the silly prejudice of over-timid capitalists, which has too long handicapped the industry of mining, is disappearing, and the grand opportunities for the profitable investment of capital are being realized. Miles upon miles of mineral lands are found in Northern Idaho, and our country is blessed with a bustling, ambitious, intelligent community, who are straining every nerve toward its development. The workings of our

mines are yielding rich returns that are dropping rapidly into the big financial basket, causing all eyes to turn in admiration to the wealth of Cœur d'Alene."

MONTANA.

Montana still stands at the head of the bullion-producing regions of the United States, having made a splendid record last year, as for several years past. Butte is now the most important mining "camp" in the country, having long since eclipsed Leadville and Virginia, and is apt to keep this position for some years to come.

Some idea of the immense amount of ore treated in Montana may be gained by a glance at the reduction works in various parts of the State. Those of Butte and Anaconda consist of mills, smelters and concentrators. In Butte the following quartz-mills are in operation: Blue Bird, 90 stamps; Lexington, 50 stamps; Alio, 80 stamps; Moulton, 40 stamps; Silver Bow, 50 stamps. At Anaconda there is a 60-stamp wet-crushing mill. Total number of stamps operating on Butte ore, 350. These stamps together crush an average of 600 tons of ore per day, or 18,000 tons per month, or 216,000 tons per annum. The great bulk of Butte ore, however, is treated in the great smelters designated as follows:

	Daily capacity, tons.
Butte & Montana	1,000
Parrot	400
Butte & Boston	100
Colorado & Montana	100
Butte Reduction Works	150
Anaconda (limited account of fire)	1,500

The Boston & Montana's new smelter at Great Falls, when completed, will treat not less than 2000 tons per day, and the Butte & Boston's new smelter, when completed, 1000 tons per day. Together they will equal the Anaconda's full blast capacity of 3000 tons. The total ore output of the Butte mines will be as follows:

Number of smelters on Butte ore	8
Capacity for the year 1889	3,250 tons
Capacity for the year 1890	6,750 tons

In addition to the great mills and smelters of Butte, there are many others located in various portions of the State and contributing liberally to its mighty output. Among the mills, the principal ones are the Granite (2), Hope, Black Pine, Cable Pyreneas, Bimetallic and Champion in Deer Lodge county; Drumlunnon (3 mills, 120 stamps), Jay Gould, Empire, Gloster and Sterling in Lewis and Clarke; Elkhorn in Jefferson; and five gold-mills in Madison and others in Beaverhead, Meagher and Missoula. There are no fewer than 900 stamps in operation in the State, other than those of Butte, numbering 350 and making a grand total of 1250 stamps pounding out silver and gold. Without knowing exactly, it is fair to assume that these stamps treat not less than 2000 tons of ore every 24 hours.

The smelting plants outside of Butte and Anaconda are few, though many are projected. The largest in operation are the Hecla Con. at Glendale, one of the best managed and most profitable institutions in the country; the Helena Mining and Reduction Company's works, near Helena, and the Great Falls smelter at the city of that name. The total capacity of these is 1500 tons per day.

From these figures an intelligent idea can be obtained concerning the amount of ore treated daily in this State. It may be more plainly set forth as follows:

Ore treated in Butte silver mills	500
Ore treated in Butte and Anaconda smelters	3,500
Ore treated in other silver mills	1,500
Ore treated in other smelters	1,500
Total	7,000

It is impossible in the space at command to even mention any except the most prominent properties. The Butte *Inter-Mountain* in its holiday "souvenir," which is very handsomely printed, gives a vast amount of information concerning the mines, but we can only make room for a few extracts.

The basis of the present great commercial prosperity of Butte rests very largely upon the number of men employed by the mining and reduction companies and the amount of wages paid out. Each year shows a great increase in the sum of money thus distributed, for the list of employees is constantly growing while the scale of wages remains the same. The following table will be of interest to those who would understand the prosperity of Butte:

Company.	Men Employed.	Monthly Pay Roll.
Anaconda (Smelter included)	500	\$300,000
Butte & Montana	300	30,000
Parrot	400	40,000
Butte & Boston	300	30,000
Blue Bird	250	25,000
Colorado	300	30,000
Butte Reduction Works	100	10,000
Lexington	250	25,000
Moulton	200	20,000
Alio	75	7,500
Cora, Wabash, Volunteer, Stevens, Ramsdell, Parrot, Star West, Clear Grit, etc.	500	50,000
	8,175	617,500

The Blue Bird produces from \$1,250,000 to \$1,600,000 a year, and the Anaconda makes yearly profits of \$5,000,000. It never has declared a public dividend.

Below appears a table of the production of the mills and smelters of Butte for the year 1889, based upon official or other reliable information. In the totals, copper is figured at 11 cents and silver at 93—about the average value of those metals during the year. The silver

bullion is figured at 800 fine. The 20-stamp mill of the Alio has been long undergoing repairs, and the great Blue Bird has been closed for nearly four months, thus accounting for the small reduction in the bullion shipments as compared with last year. The copper shipments show a great increase, as do also the silver contents of the copper matte. Had copper sold for as much in 1889 as it brought in 1888, the product of the district would show a total value of \$26,801,887.35, the depreciation in the price of copper having cost the district \$4,796,000. But the showing with copper at 11 cents is magnificent and healthy. The tabulated production is as follows:

BOSTON & MONTANA COMPANY.	
Silver, 283,107 ozs. at 93c.	\$244,689 61
Copper, 20,000,000 lbs. at 11c.	2,200,000 00
Gold, 000 ozs. at \$20	13,320 00
	\$3,118,009 61

PARROT COMPANY.	
Silver, 800,000 ozs. at 93c.	\$744,000 00
Copper, 12,000,000 lbs. at 11c	1,320,000 00
	\$8,064,000 00

ANACONDA COMPANY.	
Copper, 70,000,000 lbs. at 11c, exclusive of silver in matte	\$7,700,000 00
Bullion silver, 2,000,000 ozs. at 93c.	1,860,000 00
	\$9,560,000 00

BUTTE & BOSTON COMPANY.	
Copper, 2,500,000 lbs. at 11c.	\$275,000 00
	\$275,000 00

SILVER BOW MILL PRODUCT INCLUDED IN EXPRESS SHIPMENTS.	
	\$275,000 00

COLORADO COMPANY.	
Silver, 840,000 ozs. at 93c.	\$781,200 01
Copper, 2,400,000 lbs. at 11c.	264,000 00
Gold, 1500 ozs. at \$20	30,000 00
	\$1,051,200 00

BUTTE REDUCTION WORKS.	
Silver, 4,000,000 ozs. at 93c.	\$396,000 00
Copper, 7,000,000 lbs. at 11c.	770,000 00
	\$1,130,000 00

HORN BROOK SAMPLER.	
Silver, gold and copper value of shipments	\$560,000 00
	\$560,000 00

MISCELLANEOUS SHIPMENTS.	
Placers and small mills	\$350,000 00
	\$350,000 00

The silver bullion shipped by Wells-Fargo, American and Pacific Express Companies from the Alio, Bluebird, Moulton, Lexington and Silver Bow (Butte & Boston) mills aggregate 3274 bars, 259,913 ozs. in weight. The above bars contained on a basis of 800 fine 4,158,038 ounces of fine silver, which at the average market value of 93 cents per ounce amount to

Grand total	\$22,005,689 35
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The total amount of dividends paid by the incorporated mining companies of Montana makes an interesting and important table. During the past ten years the dividends paid by those companies only whose stock is listed have aggregated as follows:

Mine.	County.	Amount.
Alio	Silver Bow	\$800,000
Amy & Silversmith	Silver Bow	334,520
Boston & Montana	Silver Bow	925,000
Butte & Montana (gold)	Lewis & Clarke	520,000
Elkhorn	Jefferson	150,000
Empire	Lewis & Clarke	70,500
Granite Mountain	Deer Lodge	7,600,000
Helena Mining & Red'n	Lewis & Clarke	192,310
Hecla Con.	Beaverhead	1,375,500
Hope	Deer Lodge	233,000
Jay Gould	Lewis & Clarke	375,000
Drumlunnon	Lewis & Clarke	2,417,000
Moulton	Silver Bow	350,000
Original	Silver Bow	183,000
Parrot	Lexington	1,045,000
\$565,000	Silver Bow	1,045,000
Total		\$16,455,830

During the year the declared dividends of the companies above mentioned amounted to something over \$4,000,000, but it must not be supposed that the profits of the mining industry of Butte and of Montana are represented in the above table. Many of the richest mines are owned by private parties who make no public statement of their profits, while others are close corporations, having no stock on the market, and under no obligations to make dividend or other statements.

NEVADA.

Notwithstanding the many districts in the State of Nevada, the bulk of the bullion product still continues to come from the Comstock lode. The *Virginia Chronicle* states that the total bullion yield of the State in 1889 did not exceed \$8,500,000, against a total product of \$10,525,000 in 1888. The falling off is due to a lack of milling facilities for handling Comstock ore, and not an exhaustion of the resources of the mines.

Of the total bullion yield of the State in 1889, the Comstock lode produced about \$5,250,000, the product of the lode being outtailed more than a million below what it would have been had there been sufficient water-power to operate the Carson-river mills throughout the summer, which, from that cause were shut down from early in June until the middle of November.

The snowfall of the present winter has been ample to supply water for milling purposes two months later than last year, and the prospect is, therefore, favorable that the yield of the lode in 1890 will exceed that of 1889 by at least \$1,000,000, as the draining of the Gold Hill mines will add a large area to the present ore resources.

The assessments levied by Comstock mining companies in 1889 foot up to a total of \$1,831,050. The bullion product of the lode exceeds

by nearly \$4,000,000 the total sum of assessments levied.

The total ore product of the Comstock lode during 1889 aggregates about 215,000 tons, the royalty on which, when paid, will add that number of dollars to the treasury of the Comstock Tunnel Co. The income of the Virginia & Truckee Railroad Co., for the transportation of the bulk of this ore to the Carson-river and Nevada mills, will not fall far short of \$175,000, and the revenue of the mill companies for crushing it foots up to \$1,225,000.

Dan De Quille, in a letter from Nevada to the *Salt Lake Tribune*, says that from what is now to be seen it is safe to say that Nevada's yield of the precious metals for 1890 will fall little short of \$12,000,000. This will be owing to a milling season that will probably last until the middle of July (so great is the depth of snow already heaped up in the high Sierras), to the opening of new mines in the eastern part of the State, and to the yield of gold placers which will next spring be opened near our eastern border at Jeff Davis peak, and in places in White Pine county, where good prospects have been obtained.

The Comstock mines are still showing large quantities of ore. This is of a low grade compared with that taken out in the old bonanza days, yet, with plenty of water and economical working, can be made to pay a fair profit. At the Gold-Hill end of the Comstock lode preparations are being made for pumping out the old lower levels and the resumption of mining below the level of the Sutro drain tunnel. The Gold Hill mines still have considerable bodies of low-grade ore above the Sutro tunnel, but as large areas of better ore are known to exist in some of the old higher levels, the companies having enough ore naturally desire to be mining it; also it is desirable to have it in order, that it may be mixed with the ores of lower grade.

As there is a heavy fall of snow on the interior ranges of mountains, the miners in those mountains will have a good season this year, as well as all the ranchmen of the interior valleys.

The heavy fall of snow will give the Hydraulic M. Co. at Osoola a grand season. Undoubtedly they will next spring and summer wash out a vast deal of gold. Much gold will also be likely to be taken out at the newly discovered placer mines in Robinson district. These placer mines will no doubt be of great assistance to the people of White Pine county, and indeed to all in the eastern part of the State.

In Pioche the prospects of the miners are brightening, and the day may come when that town will enjoy more than its old-time prosperity. A railroad would give that whole region a big boom.

Some good mines are being opened in Nye county and in Lander about Austin. Also about Eureka some good strikes are being made both in old and new mines, and the prospects of the town are beginning to brighten.

Tuscarora holds its own well and much bullion is being shipped from the leading mines. The people of Tuscarora anticipate good times next season. The Paradise Valley mines are also doing well, and in Humboldt county some mines are being opened that bid fair to prove very valuable. Hawthorne district, in this part of the State, continues to prosper. Nearly all the veins worked are gold-bearing and some are astonishingly rich. It is "the poor man's district," as very many of the veins pay from the start, and though generally small, pockets are occasionally encountered that yield snug little fortunes.

At Aurora times are improving, and at Candalaria the Mt. Diablo is still making fair shipments of bullion.

About Silver City the miners are so situated as to make the most of the water that will flow through their town next spring. They will this winter get out a good deal of ore from the many little gold veins for which their town has been famous the past 30 years. This ore the mills near there will be able to reduce when the snows begin to melt on the mountains.

At Eureka, notwithstanding the comparative inactivity of the Richmond and Eureka Con. companies, the prospects of the camp are brighter than could have been expected a year ago, and if business is dull there are at least reasons for believing that the spring will open with greater activity than any preceding season for years past. The *Eureka Sentinel* says these reasons are the sale of several mines on Prospect Mountain, the fine developments and excellent prospects of those and neighboring properties, the strong probabilities of sampling work to be erected in the near future, and the great reduction of rates for the transportation of ore to other markets, that have made it possible to work and mine the low-grade ores of the district.

There are a large number of mines that are lying idle where pay ore may be found, many of them having large deposits of low-grade material that, differing from the past, can now be worked with big profit to the owners.

We have each week during the past year given in our "Mining Summary" a record of progress in the various camps in Nevada, and it is impossible to mention the hundreds of mines that are being developed. The great mineral region bordering on the Carson & Colorado railroad has scarcely been touched, and there are abundant opportunities for capital in most of the districts. Many of these camps have been neglected by capital for years, and the miners themselves can do little toward developing these

properties unless they are assisted. There are plenty of good properties in that region, which, if handled by moneyed men, would be very valuable. This is not only the case in the section referred to, but elsewhere in the mountains of Nevada.

NEW MEXICO.

The record of bullion production of this Territory is given elsewhere in this number of the Press. The Silver City *Enterprise* published on the first of this year an illustrated edition giving details of work in the various camps, and from these articles we condense the statements here presented. The Georgetown region is the most prosperous mining section of the Territory. The output from the camp for years past has been so regular that the public in general now regards it as a matter of fact, and the shipment of \$10,000 or \$15,000 in bullion and several cars of rich ore in a week or month attracts but little attention.

From Alex. McGregor, now in charge of the property, the *Enterprise* learns that the lowest grade ore taken from the mines averages 51 ounces, while the average of the mill-run for the year was \$6 6 ounces. This does not include the very rich ore, which is usually shipped to Socorro for treatment. Seven tons of this class of ore shipped last month returned \$5000. This is somewhat above the usual high-grade ore, and is given simply to show that Georgetown can produce ore of as high a grade as any other camp in the country. During the past year the output of the Mimbres Cons. Mining Co.'s property was 290,400 ounces, which was unusually light, owing to the immense amount of deadwork being done.

The leasers last year took out of the McNulty mine \$20,000. Rahy and Vellines are the names of two new camps, distance respectively six and eight miles from Georgetown, in a southeasterly direction. They appear to be an extension of the Georgetown mineral belt.

In Grant county (where Silver City is situated), the mining industry leads all others in point of capital invested, returns received and the almost unlimited field for exploration which yet remains open for the energetic prospector. As yet, the various mineral zones throughout the county have, at the very best, been imperfectly prospected, in short, indulging in a term in common parlance, that which has been accomplished consists of the merest scratching.

The silver-bearing areas may be divided into two distinct districts—the one at Georgetown and Bear Mountain (Fleming), and Chloride Flat, constituting the lime, quartzite and porphyry, and Black Hawk the granitic, or, as it is frequently termed, syenite, the other. Following the discovery of gold came the location and development of the wonderful deposits at Georgetown, Chloride Flat, Fleming and Black Hawk, which unitedly have yielded, in a little more than a decade, over \$15,000,000 in silver; and, while to many the term deposit is indicative that complete exhaustion of ore bodies follows development, late explorations of the lime areas conclusively show that the virgin ground is proving to be fully as rich and as productive as the territory first exploited. The larger portion of the ore is free milling, and the advantage of home treatment of the low grades has built up and sustained a population noted for its energy, thrift and enterprise. The higher grades, carrying from \$100 to \$500 per ton, are shipped to distant points.

The lead ores are principally carbonates, yielding from 20 to 60 per cent in lead to the ton, and from \$20 to \$150 per ton in silver. Cook's Peak has been carefully exploited and developed, and the yield has proven a bonanza to the owners.

The zinc interests are specially noted for their extent, high percentage, and the purity of the mineral carrying this metal. The mineral zone bearing this metal is confined to the southeastern portion of Hanover gulch, in which a dozen or more claims have been located. Zinc smelters in the East are offering \$24 per ton for zinc carbonates, which leaves to the miner a small margin after all mining expenses have been paid, which includes transportation to the eastern side of the Mississippi river. Carload lots are now transported at rates not exceeding \$10 per ton.

There are three gold-mining districts in Grant county—Pinos Altos, Carlisle and Gold Hill. The veins in each are true fissure, and occur in the granite rocks. In width they range from 6 inches to 20 feet, and the general strike is from a few degrees east of north to an east and west course. Free vanners and other machines are used for concentrating the ores, and the resultant concentrates are shipped to distant smelting establishments, where they are sold. Pinos Altos at present is the leading producer, but it is a mere question of time before Gold Hill and Carlisle will rapidly come to the front and show up quite as handsomely as their more fortunate neighbor. It is a noteworthy fact that the gold mines in the districts alluded to are easily and cheaply mined, and the attendant expense of timbering is not nearly so great as in other countries as favorably situated as New Mexico for mining purposes. The gold bullion produced annually foots up about \$750,000, which is mined at an expense of about \$500,000, leaving a profit of \$250,000, or 33 1/3 per cent on the investment. There are several large companies constantly engaged in developing their property.

Among other districts, Hanover gulch is pre-eminently rich in copper ores. Thousands of tons of iron are also shipped annually to the smelting establishments of El Paso and Socorro.

Bald Mountain is among the latest discovered of the many districts tributary to Silver City. The Silver King mine, in that district, is a wide and defined vein with a value of \$15 to \$25 a ton. The "Three Sisters" Peaks and district of that name is a very prominent landmark of the southern-central portion of the county. The yield of ores has been remunerative and the faith in the future of the camp has prompted several of the owners to protect their claims by U. S. patents. A sale of \$15,000 was consummated during the early summer of 1889.

At Hachita the "blanket veins" are of extraordinary width and the lead riches have an average of 30 per cent of lead to the ton. The discovery of these deposits is quite recent, and the investment of El Paso capital is intended to foster the smelting enterprises of that city. Thus far the mines have proved better than represented, and it is more than probable that the present output of 350 tons per month will by the first of May be increased fully 100 per cent. The ore carries from \$8 to \$30 per ton in silver.

The Sierra mines of Lake Valley, after some vicissitudes, are making ore shipments from 15 to 20 cars per month. The mines of Lake Valley are not second in importance to any in New Mexico. They have paid about \$2,000,000 in dividends to their owners. All the mining claims of the group are now owned by one company, the Silver Mining Company of Lake Valley.

Lordsburg is surrounded by rich mining camps, all of which are directly tributary to it. To the north are Carlisle, Malone and Gold Hill. To the south are Hachita, Pyramid and Shakespeare, and to the west is Stein's Pass. Shakespeare is one of the oldest mining camps in the southern part of the Territory, having been a large producer before the Southern Pacific road was built. There are in this camp some of the largest ledges of low-grade ore in the Southwest. Two large companies are now operating in the camp. The Hercules Co. headquarters at Memphis, Tennessee, has a 10-stamp mill at work, and intends soon to largely increase its capacity. The Standard Mutual Co. of Baltimore has a small mill at the camp and is now negotiating for a reduction and smelting plant, which will handle 100 tons of ore per day.

At Carlisle, 100 men are now employed. The lead contained in the ore on concentration has been quite profitable. Concentration is effected by the aid of 36 Frue vanners. The monthly output averages \$10,000. A Westinghouse electric plant is being placed in position for the use of the mill and buildings occupied by the company. Under the new management the company is rapidly regaining lost ground.

At Pinos Altos, the gold camp, are a number of producing mines. The outlook for the camp, notwithstanding adverse circumstances, is flattering, and the oft-repeated alarm which has been sounded that values in the ore cannot be saved is without foundation in fact, and with careful business tact and skillful management, the output for the year, \$350,000, will be increased during 1890 to at least \$3,000,000 in gold.

OREGON.

In a recent address before the Board of Trade of Baker City, Or., Hon. James P. Faulk said: Among the first counties that attracted attention as a favorable field for mining, Baker county was foremost. Away back in 1862, when but little was known of what now constitutes the Great Inland Empire, gold was discovered at Auburn, and a stampede of miners, speculators and many others flocked to the new gold-field. Other discoveries followed, such as Winterville, Parkerville, Robinsonville, Granite Creek and a number of others, which, during the following season, produced about \$5,000,000 worth of gold-dust. No attention was at that time paid to quartz mining, and no quartz mines of a productive character had been discovered except the Virtue mine, which produced many thousands of dollars and was worked spasmodically for many years, and produced nearly three millions of money.

After the exhausting of the rich placers, mining remained quiet for a number of years. Attention was diverted toward mines of gold, silver and copper and other precious and useful metals, and each succeeding year added new and important mining properties to those already uncovered, until now we are the most important county in the whole State in the production of metals, both precious and useful. Among the important mining companies operating in this county I will name: The Connor Creek Mining Co., located at Connor Creek; mill of 35 stamps; the Eureka & Excelsior M. Co., located at Cracker Creek; mill, 20 stamps; the Gold Ridge M. Co., mill, 10 stamps; Bonanza M. Co., mill, 10 stamps; Virtue M. Co., mill, 20 stamps; White Star M. Co., mill, 10 stamps; Elk Horn M. Co., mill, 10 stamps; Cleveland M. Co., mill, ten stamps; Oregon Gold M. Co., Cornucopia, mill, 20 stamps; Auburn M. Co., mill, five stamps; Miner M. Co., mill, ten stamps; Elk Horn Extension M. Co., mill, ten stamps; La Bellevue M. Co., mill, 20 stamps; Monumental Silver M. Co., mill, 20 stamps; Golden Monarch M. Co., mill, ten stamps; Baker City M. Co., mill, ten stamps; Worley M. Co., mill, ten stamps; Phoenix M. Co., mill, ten stamps; Evening Star M. Co., mill, ten stamps. Added to these are as many that are operating with arrastras.

Many additional mines ship their product to the smelters at Denver, Salt Lake, Puch-

lo and San Francisco, and many more are only in an incipient stage of development, which will be among the future bonanzas of the Pacific Northwest and enrich the owners and the State millions of dollars. Take a retrospective glance over the past five years, and see what has been accomplished in our mineral development. When the railroad was completed, our mines had received no attention from capital. We were a terra incognita to the adventurous speculator, and they both turned from us with contempt or pity when we mentioned our mines. All this is now changed. Capital now seeks investment in our mining properties, and the ever-necessary middleman and promoter is always with us. Our limestone and lime have attracted much attention, and shipment of many trainloads has been made. That which has been made is only an atom of what will follow.

UTAH.

A tabular statement of the bullion product of Utah is given on another page, showing in some detail the character of the metal output.

Mining in the Territory has been generally successful. Still the status of the lead question, as regards foreign importations, has been unsatisfactory to the lead miners, and the discount on silver has also been a detriment. The base metal and ore output from Utah to foreign points for the year show a decided increase over last year.

The Salt Lake *Tribune* gave the best summary of the mining industry of last year of any paper on the coast, including not only the mines of Utah, but those of Montana, Idaho and Wyoming. From the various articles in that paper we make up the following notes:

Tintic district had a very prosperous year, and has developed so well as to establish it as the next to the best in Utah. The Eureka Hill property is now down 900 feet and they employed last year an average of 200 men. The Bullion Beck and Champion property is doing well, having divided \$300,000 among its owners last year. The Centennial-Eureka product in 1889 was 1,827,000 pounds, which gave a net product of 243,141 pounds of lead; 29,287 pounds of copper; 86,656 ounces of silver, and 292 ounces of gold. A dividend of \$22,500 was paid. The Gemini group, the Eagle, Summit and Lookout and others have done well. The Northern Spy produces very high-grade ore. The Mammoth paid \$120,000 in dividends last year.

In Beaver county, as to the Horn Silver, the full work of the property has not been made public, but shipments have gone on steadily all the year.

The Hanauer smelter output last year was 4635 tons of lead; 582,650 ounces silver and 6250 ounces of gold, valued at \$900,000. The Germania lead works made a good showing for the year, and yet were idle part of the time. The Germania furnace's production for the year ending Dec. 31, 1889, estimated from December 18th to 31st. The furnaces were out of blast January 1st to June 15th.

	Gross wt. lbs.	Lead wt. lbs.	Oz. Silv.	Oz. Gold.
Base bullion...	4,796,730	4,761,686	364,516.53	4,361.31
Selected lead...	2,359,540	5,859,540	.....	.....
Copper matte...	270,943	14,176	8,350.64	7.22

The Mingo Co. statement is as follows: During the year this company ran through its furnaces:

Ore, matte and fine dust,	79,660,000 lbs.,	39,830 tons.
Fluxes:		
Iron ore,	5,654,698 lbs.,	2827 tons.....
Limestone,	17,382,125 lbs.,	8691 tons.....
Fuel used—		
Coke and charcoal,	10,090,000 lbs.,	9545 tons.....
Coal and slack,	9,335,000 lbs.,	4669 tons.....
		16,730

Lead,	11,978,639 lbs.,	5939 tons.....
Copper,	538,610 lbs.,	269 tons.....
Silver,	592,517 ozs.,	.....
Gold,	6168 ozs.,	.....

At Park City the Octario property still stands at the head of producing mines of the district. During the year 1889 its product was:

Bullion from ore crushed.....	\$901,798 42
Ore shipped 9330 tons.....	763,000 00

Total.....\$1,654,798 42

The Daily property moved along with its production and development regularly during the year and is now in better condition than ever. During the year its product was 296,163 ounces silver, 296 ounces of gold of a gross value of \$253,017. The ore sales were \$328,264. The sulphides sold for \$435,420.

The Crescent shipped 3273 tons of ore and cinnabar, valued at \$145,564. During the past year mining operations have been conducted steadily on a moderate scale in Little Cottonwood district. The Emma, Flagstaff and Vallejo have been industriously prospecting for bonanzas similar to those that made this camp famous in years not long passed, and the indications are such that those interested have well-grounded hopes that large bodies of ore will again be developed.

At Stockton the Honerine Co. shipped 2200 tons of \$40 ore. At Bingham the Lead Mining Co. made an output of 16,200 tons first-class ore and concentrates. This yielded 5500 tons of lead and 150 ounces of silver. From this camp there were shipped by various mines 21,041 tons of ore; showing a very prosperous condition of affairs. At Silver Reef the Stormont shipped last year \$37,504 and the Christy \$46,201. The Utah coal-fields are now quite important and make large shipments. The Pleasant Valley Coal Co. shipped 141,049 tons, Union Pacific 65,711 tons, and Home Coal Co. 36,135 tons, besides a home consumption of about 63,000 tons.

Assessment Notices.

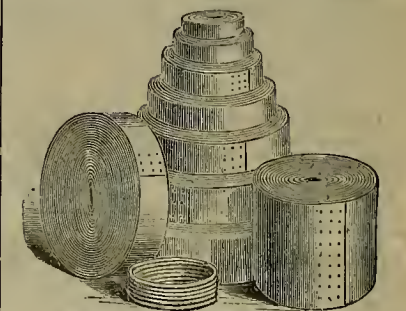
Gray Eagle Mining Company. Location

of principal place of business, San Francisco, California. Location of Works, Placer Co., Cal.

NOTICE is hereby given that, at a meeting of the Board of Directors, held on the 21st day of January, 1890, an Assessment, No. 16, of Four (4) Cents per share was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin, to the Secretary, at the office of the Company, Room 11, No. 303 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the Twenty-fifth (25th) day of February, 1890, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 17th day of March, 1890, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
J. M. BUEFINGTON, Secretary,
Office, Room 11, No. 303 California St., San Francisco, California.



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List of U.S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

FOR WEEK ENDING JAN. 21, 1890.

419,998.—PILE COVERING.—H. Anderson, S. F.
 419,938.—GOLD-SAVING APPARATUS.—O. H. Bagley, Knappa, Or.
 419,919.—SPITTOON.—A. F. Brown, S. F.
 419,820.—HARROW AND CULTIVATOR.—A. C. Brown, Eugene City, Or.
 419,632.—MACHINE FOR CLEANING FIBER.—W. L. Brown, S. F.
 419,842.—PIANO SOUNDING BOARD.—A. J. Dewing, S. F.
 419,843.—FILTER.—J. G. Divoll, Oakland, Cal.
 419,705.—CAP, PILLOW AND LIFE-PRESERVER.—F. Frank, Grass Valley, Cal.
 419,851.—MACHINE FOR WRAPPING BLOCK MATCHES.—Geo. Grisel, S. F.
 419,992.—CABLE RAILWAY.—L. Heynemann, S. F.
 419,679.—FIFTH WHEEL.—H. P. Kelly, S. F.
 419,680.—TRANSON LITTER.—James Kelly, San Diego, Cal.
 419,681.—TRANSON LITTER.—James Kelly, San Diego, Cal.
 419,691.—CULTIVATOR.—S. T. Likens, Amity, Or.
 419,692.—SASH FASTENER.—D. O. Livermore, Los Gatos, Cal.
 419,874.—VALVE GEAR FOR FLUID RAMS, ETC.—John Parker, S. F.
 419,726.—NEUTRALIZING SULPHO-CHLORINATED ORGANIC COMPOUNDS.—A. Sommer, Berkeley, Cal.
 Note.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

PIANO SOUNDING BOARD.—A. J. Dewing, S. F. No. 419,842. Dated Jan. 21, 1890. This improvement in the sounding-board for pianos consists in certain details of construction. In the usual construction of sounding-boards they are made of selected spruce or pine cut into narrow strips having parallel sides, these strips being glued together until a board of sufficient size has been formed, and the board is further strengthened by suitable cross-braces secured upon its back. The method of applying strings to the piano is such as to obtain a proper length of strings for the various portions of its register from the lowest bass to the highest treble, and the construction of the sounding-board before described is such that the boards become very short at either end. This invention is designed to give a greater length and a corresponding improvement to the tone of that portion of the sounding-board upon which the bridge supporting the bass and longer strings of the piano are fixed; and it consists in making a central portion of the sounding-board of strips which are narrower at one end than the other, so as to gradually change the direction of the strips and bring those toward the lower end of the sounding-board into such a position as to extend from side to side instead of diagonally.

GOLD-SAVING APPARATUS.—Olin H. Bagley, Knappa, Oregon. No. 419,908. Dated Jan. 21, 1890. This is a machine principally intended for saving gold from black sand. The riffle has a recessed face formed by turning the material at one side of the riffle back upon itself, said riffle having projecting end flanges or wings. The whole table is suspended at an inclination on hangers so it gets an end-bump and side-shake. The gold-bearing sand and sufficient water are fed upon the head of the table, and, passing first over a grooved plate, the current is broken and sufficiently retarded to prevent the stuff from rushing too fast over the first riffle of the series. Then meeting said riffle, a separation of the gold from the sand takes place, the gold being caught by the beveled or recessed face of the riffle, and spreading out to each end thereof, leaves the sand and water about the center of the riffle over which it flows, and repeats the action on the next riffle. At the ends of each riffle the flanges or wings prevent the water from splashing sand or gold over the ends and keep the sand and water nearer the center.

STATIONARY SPITTOON.—Alonzo F. Brown, S. F. No. 419,919. Dated Jan. 21, 1890. This stationary spittoon is specially useful for railway cars or carriages. It consists of a concaved depressed surface which is fitted into the floor of the car or other place where it is to be used, and has a central opening through which the contents may escape, and in combination therewith of a valve which may be opened either automatically or by pressure of the foot upon the connecting or operating pin. This pin extends up through the floor, and by simply pressing the foot upon it, the elasticity of the spring will be overcome and the valve will be opened so as to allow the contents of the spittoon to be released. Immediately upon releasing the pressure, the spring closes the valve again and thus keeps out the wind and dust.

VALVE-GEAR FOR FLUID-RAMS AND PISTONS.—John Parker, S. F., assignor of one-half to Hugo P. Frear. No. 419,874. Dated Jan. 21, 1890. This invention relates to that class of

machines to be operated by water or other fluids, and usually known as fluid-rams or pistons, and the invention consists in the novel mechanism for operating the valve and controlling the motion of the ram or piston. The object of the invention is to provide a simple and effective mechanism for safely controlling the motion of the ram.

PILE-COVERING.—Henry Anderson, S. F., assignor to R. J. Davis. No. 419,998. Dated Jan. 21, 1890. This is an improved covering for piles which are driven for building wharves and other similar purposes. The pile is oased in sections of sheet metal curved to fit the pile and having flanges by which they are united together by bolts when placed about the pile. This patent covers a method of breaking joints and also protecting the pile at the place where the joints occur.

MACHINE FOR WRAPPING BLOCK MATCHES.—Geo. Grisel, Golden Gate, assignor of two-thirds to Frank Severio and J. D. Case. No. 419,851. Dated Jan. 21, 1890. This invention relates to that class of wrapping machines designed for folding or wrapping paper about such things as block matches. The invention consists in a series of traveling axially-rotary holders for the match blocks, whereby said blocks are rotated and wrap the paper about them. There is also a paper feed clamp for holding the paper to the blocks, knives for cutting it into suitable lengths, a roller for pressing the paper down on the blocks, means for discharging the wrapped blocks from the holders, and various mechanical powers and movements to effect the several operations. The object of the invention is to wrap such articles by machinery.

FILTER.—J. C. Divoll, Oakland. No. 419,843. Dated Jan. 21, 1890. This invention consists of a flattened disk-shaped filter chamber connected at the top with the faucet or inlet pipe and having a discharge pipe below. Within the horizontal disk is fixed the filtering medium. A faucet plug extends down through a central barrel, and by means of passages arranged in this plug, and openings in the sides of the barrel, above and below the filter, the water may be admitted either above or below the filter. This is effected by simply turning the plug half around, and when the water is admitted to one side of the filter the passages in the barrel allow it to enter the barrel from the opposite side of the filter so as to be discharged. The filter is reversed by turning the plug half around and is thus easily cleaned.

A New Music-Leaf Turner.

A Welcome Invention in the Musical Line.

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When the music is placed upon this apparatus, the leaves are clasped by artificial fingers, and the performer can then, by a slight movement of either foot, turn the leaves to the right or left, back and forth, quickly or slowly, any required number of times, and with more certainty and precision than if done by the human hand, thus relieving him from one of the greatest annoyances while rendering rapid and difficult music.

The leading artists of San Francisco, as well as the dealers in musical merchandise, have carefully examined this device of Mr. Schuyler's, and, without a single exception, have indorsed it in written testimonials, two of which we give below—one from an artist who has but few equals in this world, and the other from a well-known commercial house.

SAN FRANCISCO, Jan. 24, 1890.

Mr. D. Schuyler—DEAR SIR: Permit me to express to you my great appreciation and delight on examining your "music turner." I heartily indorse it, and feel it will be a great boon to all musicians and lovers of music. The turning of the leaves back and forth has excited my greatest wonder, and I hope you will meet with abundant success. Very respectfully,

S. MONROE FABIAN,

Professor of Music.

HISTORY B'LO'NG, SAN FRANCISCO, Jan. 25, 190.

Mr. D. Schuyler—Having personally seen and examined your instrument for turning the leaves of music, which you term the "D. Schuyler music turner," we wish to express our unqualified appreciation of it, and confidently predict that as soon as you have the apparatus ready to place on the market, either as a permanent attachment to a piano or separate, it will have a large sale. We hope that you will keep us thoroughly posted, and send us a sample with prices as soon as you have them ready to supply, as we are confident that we can dispose of a great many in connection with our piano and organ department. Wishing you every success, we are very truly yours, THE BANCROFT COM'Y.

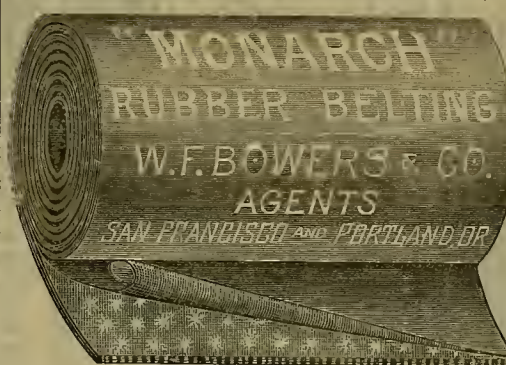
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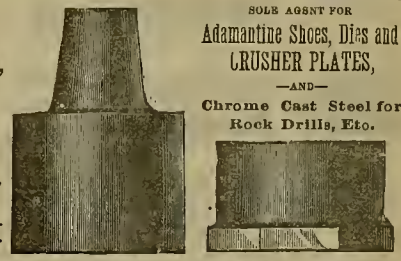
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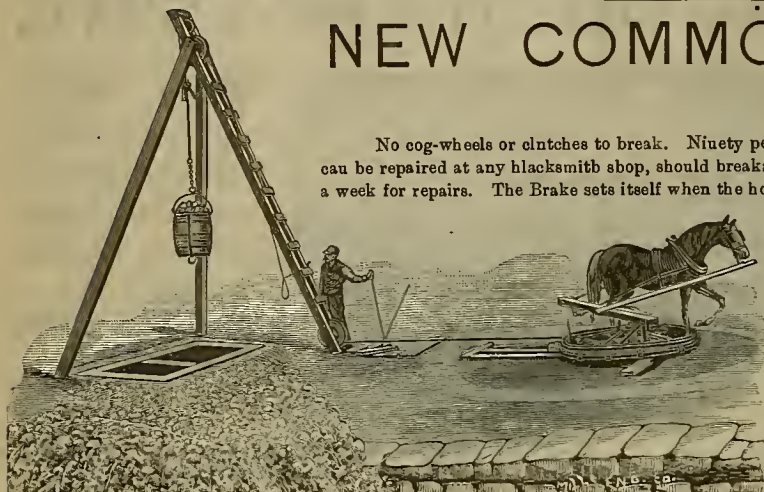
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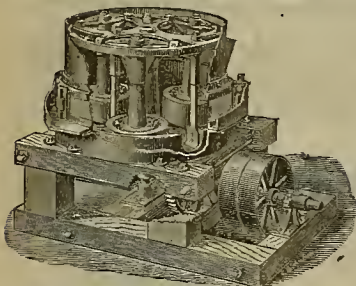
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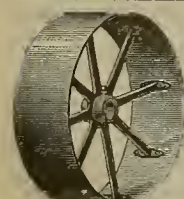
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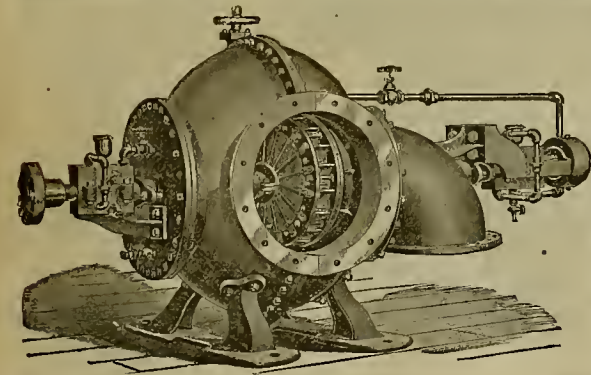
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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, Jan. 30, 1890.

The weather and general transportation business have gone from bad to worse, with the end apparently not yet. Trade is in about as badly a demoralized condition as it can possibly be, notwithstanding which all business men are buoyed up with the impression grounded on past experience, that the future holds in store more general prosperity than has been witnessed for several years past. Confirmed advices are at hand going to show that previous to the rains a large majority of the farmers and others who overbought during the land-boom of two or three years ago, have either about worked out of debt or had arranged their indebtedness in such a way as to meet it without any great inconvenience. The call for men to work on the different railroads has given employment to a large force of idle hands. Previous to this there was great suffering among many day laborers. Even now there are large numbers out of employment, only finding work during fair weather.

Money is not, as a rule, close. The disbursements since the beginning of the year have been quite heavy. Remittances from the country are light, owing to bad roads. A steamer from Portland, Oregon, brought in the past week over \$235,000. Other coast steamers brought in sums ranging from \$500 up to \$50,000 and over.

MEXICAN DOLLARS—There was fair trading during the week, chiefly by Chinamen. The price ranged from 76 to 76 1/2 cents.

SILVER—The English market advanced up to Monday, when bullion was quoted at 44 1/4; on Tuesday it fell off two points, being quoted at 44 1/4, and yesterday four points, closing at 44 1/4. The sensitiveness of silver confirms its friends in their previously expressed opinion that the metal is not only scarce, but also that the production is not equal to the world's requirement. This is quite marked when India or any other large buyer enters the market, by the rapidity with which the price advances, and after each upward move it does not fall to as low a figure as it started from. It now looks as if silver will offer for some time, or until the United States comes to its rescue, a fine opportunity for speculation. Mail advices from Washington report the Silver Committee appointed by the St. Louis Convention actively at work trying to secure free coinage, and to that end they are in consultation with representative bimetalists in all parts of the Union.

In our market, silver bullion gradually advanced, until on Tuesday as high as 98 cents was paid by the Mint, although the largest proportion of its purchases on that day was made at 97 1/2 cents. At the latter price the market was cleaned up of all small parcels. Large holders of silver are not in the market as sellers except at higher prices. On Tuesday, with silver at 44 1/4 in London, and at that day's quotations for sterling exchange, the parity of silver in our market was about 98 1/2 cents. Exporters had an advance the past week for silver, going as high as 97 1/2 cents last Monday.

London cablegrams came through to-day quoting silver at 44 1/4. At to-day's rates for sterling exchange, the parity would be in our market about 98 1/2 cents. There is no silver offering here, but as this is "Department Day" in Washington city, that which has been offered there was not known up to this writing; however, as the Mint had cleared up our market of all available parcels, it is not at all likely that any was offered for sale to the Department.

QUICKSILVER—Receipts the past week aggregated 150 flasks, and exports by sea 40 flasks to Mexico and 24 flasks to Mazatlan. Bad and almost impassable roads have largely reduced receipts, causing quite an advance in the market. Sales were made the past week up to \$50, at which price the market closed.

BORAX—Receipts the past week aggregated 500 casks. The market continues strong at full figures. There was exported 100 lbs the past week, to Mexico.

LIME—Receipts the past week aggregated 477 hhls, and exports by sea, 200 hhls to Honolulu. The demand is still slow, owing to unfavorable weather.

LEAD—Imports the past week aggregated 489 pigs from London. The market is essentially unchanged. The output of the mines, owing to bad weather, is considerably curtailed.

COPPER—The market has held fairly strong throughout the week. The absence of late telegraphic market reports (not quotations) of the Eastern and European markets, leave us in the dark as to late influences on the market. The following late mail advices we obtain from the Paris correspondence of the London Mining Journal, under date at Paris of Jan. 9:

"It is generally believed in France that the copper possessed by the Comptoir d'Escompte can be gradually disposed of at considerably above \$40 per ton. The shareholders' action in indorsing the policy of the liquidators has had the effect of further strengthening the market for copper mining shares, and these are rising in prices. Rio Tinto shares have advanced to francs during the past few days. Financial authorities in Paris speak, as a rule, pretty hopefully upon the future of the copper market. They regard it as probable that it will continue to maintain the firmness which it has lately developed, and that prices will be subject to a movement of steady advancement under the legitimate influence of decreasing stocks and expanding consumption. The action of the shareholders of the Comptoir d'Escompte is taken as conclusive proof that no attempt even will be made to reconstitute the former monopoly. It is urged that the present conditions of the copper market afford every reason for the belief that it will be able to absorb in time the stocks that have been left as the outcome of the unfortunate syndicate incident. The great extent to which copper is being used in new engineering and electric-lighting schemes is another important point in favor of a hopeful view of its future. The only danger which is regarded as really likely to interrupt the prosperous development of the copper market is that of overproduction."

TIN—Imports the past week aggregated 38,499 boxes of plate. The market for spot plate is heavy and dull under liberal offerings by weak holders. The last reported sale was \$4.60 to a leading can manufacturer. For shipment, no business can be

done at asking prices. For pig tin the market is slow and easy.

IRON—Imports the past week aggregated 120 tons of pig iron from Irondale. The market is slow but very strong. Holders are not willing to make concessions, believing that with renewed business they may be able to obtain an advance. The destruction of bridges, etc., by high water, it is claimed, will create a more active demand for pig to be used in the building of new bridges.

COAL—Imports the past week aggregated as follows: From Baltimore, 1812 tons; Coos Bay, 1200; Port Townsend, 1149; Seattle, 2500; Departure Bay, 2350; Sydney, 850; total, 8851 tons. The market continues strong at unchanged quotations for prompt shipment of Australia. The spot market and near-by arrivals of Australian are steadier. In coast coals there is nothing new to report. The demand for coals is only fair, but a decided increase in the consumption of steam coals is looked for with more settled weather.

Eastern Metal Markets.

By Telegraph.

NEW YORK, Jan. 30, 1890.—The following are the closing prices the past week:

The closing prices the past week.					
	Silver in		Silver in		
	London		New York.		
			Copper.	Lead.	Tin.
Thursday.....	41 9-16	07	\$14 40	\$3 82	\$20 50
Friday.....	44 1/4	07 3/8	14 40	3 82 1/2	20 50
Saturday.....	44 1/4	07 3/8	14 40	3 82 1/2	20 50
Monday.....	44 1/4	07 3/8	14 40	3 82 1/2	20 50
Tuesday.....	44 1/4	07 3/8	14 40	3 82 1/2	20 50
Wednesday.....	44 1/4	06 3/4	14 40	3 82 1/2	20 50

Owing to the telegraph lines being in poor working condition, we are unable to get any Eastern markets by telegraph.

San Francisco Metal Market.

WHOLESALE. THURSDAY, January 30, 1890.

ANTIMONY.....	25 @	7 1/2
BORAX—Refined, in carload lots.....	7 @	7 1/2
Powdered.....	7 @	7 1/2
Concentrated.....	7 @	7 1/2
All grades jobbing at an advance.....		
COPPER—		
Bulk.....	21 @	22
Sheeting.....	22 @	24
Ingot, jobbing.....	17 @	18
do, wholesale.....	15 @	16
Fire Box Sheets.....	22 @	24
LEAD—Pig.....	4 @	4 1/2
do, refined.....	4 @	4 1/2
Sheet.....	7 @	7
Pipe.....	5 @	5
Shot, discount 10% on 500 bags Drop, 3/4 bag.....	1 45 @	1 45
Chilled, do.....	1 65 @	1 65
TINPLATE—B. V., steel grade, 14x20, P. S.....	5 50 @	5 50
B. V., steel grade, 14x20, spot.....	4 60 @	4 60
Charcoal, 14x20.....	6 75 @	7 00
do, roofing, 14x20.....	42 @	42
do, do, 20x25.....	42 @	42
Pig tin, spot, 1/4 lb.....	21 @	22
COKE—Eng. ton, spot, in bulk.....	13 50 @	15 00
do, do, to load.....	19 @	19
QUICKSILVER—By the flask.....	50 @	50
Flasks, new.....	35 @	35
Flasks, old.....	35 @	35
CHROME IRON ORE, 1/2 ton.....	10 00 @	10 00
IRON—Bar, base.....	3 @	3 1/4
Norway, base.....	4 @	4 1/4
Spot.....		
TO LOAD.....		
IRON—Glenbrook ton.....	35 @	35
Eghinton ton.....	35 @	35
American Soft, No. 1, ton.....	— @	35 00
Oregon Pig ton.....	— @	35 00
Puget Sound.....	— @	35 00
Clay Lane White.....	— @	35 00
Shotts, No. 1.....	— @	35 00
Bar Iron (base price) 1/2 lb.....	— @	35 00
Langdon.....	— @	35 00
Thorncliffe.....	— @	35 00
Gartsherrie.....	— @	35 00

Coal.

	Per Ton.	Lehigh Lump.	16 50 @ 17 00
Australian.....	7 50 @	7 75	16 50 @ 17 00
Liverpool S.F.M.....	8 50 @	—	Cumberland 16 00 @
Scotch Splint.....	9 00 @	9 00	Eggs, hard..... 15 50 @
Cardiff.....	9 50 @	10 00	
SPOT FROM YARD.....			
Wellington.....	8 00	Seattle..... 7 00	
Scotch Splint.....	9 00	Coos Bay..... 6 00	
Greta.....	9 00	Cannel..... 12 00	
Westminster Brymbo.....	9 00	Eggs, hard..... 18 00	
Nansam.....	9 00	Cumberland, in sacks 16 00	
Sydney.....	8 00	do, bulk..... 14 00	
Gilman.....	7 00		

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BELTING—Alex Heins, successor to Heins & William, commenced operating in 1887 a leather and felled rawhide belting factory, located at 504 Front street. His business was increasing so much that it was necessary to look for more room, and he has lately removed to 134 Main street, where he now has one floor of 46x120 feet, with steam-power. This shows that Mr. Heins is making progress with his business, and mining men will do well to call on him for anything in his line.

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ASSESSMENTS.

COMPANY.	LOCATION.	NO. AM'T. LEVIED.	DRUGGIST.	SALE.	SECRETARY.	PLACES OF BUSINESS.
Adelaide Copper M Co.....	Nevada.....	1.....	Dec 31.....	Feb 17.....	W H Graves.....	426 Sansome St
Baldmore M Co.....	Nevada.....	1.....	Jan 1.....	Feb 12.....	A K Grim.....	402 Montgomery St
Camp Creek M & M Co.....	California.....	1.....	Dec 30.....	Feb 12.....	A S Folger.....	218 Fremont St
Con New York M Co.....	Nevada.....	2.....	Dec 11.....	Jan 15.....	C E E Bott.....	309 Montgomery St
Con St Gothard M Co.....	California.....	1.....	Jan 14.....	Feb 17.....	T Wetzel.....	522 Montgomery St
Crocker M Co.....	Arizona.....	1.....	Jan 23.....	Mar 5.....	N P Messer.....	309 Montgomery St
Exchequer M Co.....	Nevada.....	23.....	Dec 15.....	Jan 29.....	C E Elliott.....	309 Montgomery St
Gold-P Giant M Co.....	California.....	1.....	Dec 17.....	Jan 23.....	H T Briggs.....	Downtownville
Grand Prize M Co.....	Nevada.....	21.....	Jan 27.....	Mar 5.....	R R Grayson.....	327 Pine St
Gray Eagle M Co.....	California.....	15.....	Jan 21.....	Feb 25.....	J N Huntington.....	303 California St
Kontack M Co.....	Nevada.....	20.....	Jan 11.....	Jan 23.....	M J Pev.....	310 Pine St
Mayflower Gravel M Co.....	California.....	45.....	Dec 27.....	Feb 3.....	J Morizo.....	378 Montgomery St
Mexican M Co.....	Nevada.....	39.....	Dec 25.....	Feb 6.....	J H Elliott.....	309 Montgomery St
Miueal King M & M Co.....	Arizona.....	4.....	Jan 10.....	Feb 10.....	P H Leonard.....	419 California St
Natoma Water & M Co.....	California.....	2.....	Dec 21.....	Jan 23.....	P W Ames.....	519 California St
Occidental Cos M Co.....	Nevada.....	5.....	Jan 20.....	Feb 25.....	A K Dumber.....	309 Montgomery St
Overman S M Co.....	Nevada.....	61.....	Dec 31.....	Feb 5.....	G D Edwards.....	419 California St
Russell R M Co.....	California.....	6.....	Jan 13.....	Feb 17.....	J M Wizio.....	324 Montgomery St
Seg Belcher & Mides M Co.....	Nevada.....	5.....	Jan 25.....	Feb 6.....	E B Holmes.....	309 Montgomery St
Silver King M Co.....	Arizona.....	2.....	Jan 15.....	Feb 26.....	A W Waterman.....	309 Montgomery St
Tyler M Co.....	California.....	3.....	Dec 1.....	Jan 23.....	J J Garrett.....	309 Montgomery St
True Cons M Co.....	California.....	8.....	Jan 18.....	Feb 15.....	J C Bates.....	434 California St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Albama, Humboldt & Bailey M Co.....	California.....	W H Watson.....	302 Montgomery St.....	Annual.....	Feb 10
Bechtel Cons M Co.....	California.....	O F Griffin.....	303 California St.....	Annual.....	Feb 10
Cibola Creek M Co.....	Nevada.....	I Osborn.....	319 Montgomery St.....	Annual.....	Feb 3
Holmes M Co.....	Nevada.....	C E Elliott.....	309 Montgomery St.....	Annual.....	Feb 11
Lucky Hill Cons M Co.....	California.....	R D Black.....	522 Montgomery St.....	Annual.....	Feb 13
Oak Cons M Co.....	Nevada.....	E J Ryan.....	230 Montgomery St.....	Annual.....	Feb 3
Sunderhaus G M Co.....	California.....	H T Cresswell.....	504 Kearny St.....	Annual.....	Feb 11

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Champion M Co.....	Nevada.....	T Wetzel.....	522 Montgomery St.....	10.....	Jan 20
Caledonia M Co.....	Nevada.....	A S Chumant.....	328 Montgomery St.....	08.....	Aug 5
Con California & Va M Co.....	Nevada.....	A W Havens.....	309 Montgomery St.....	25.....	Jan 10
Boston Gravel M Co.....	California.....	T Wetzel.....	522 Montgomery St.....	10.....	Dec 23
Idaho M Co.....	California.....	J J Ryan.....	230 Montgomery St.....	5 00.....	Nov 7
Mt Diablo M Co.....	Nevada.....	R Heath.....	319 Pine St.....	30.....	Oct 21
Pacific Borax Salt & Soda Co.....	California.....	A H Clough.....	230 Montgomery St.....	1 00.....	Feb 10

Mining Share Market.

Trading the past week under review was quite light; hardly enough business was done to deserve calling the transactions "a market." The snow-blockades having laid an embargo on news from the principal speculative mines, the outside public groped in the dark worse than ever before; and to see cinchers of insiders or any other persons searching for points how to get the best of those who supply through tools, the street points, is very much like blind persons trying to get other blind persons to lead them by echoes. The return of Capt. Voll is looked upon by some as a forerunner of a market, or in other words he is a John the Baptist of the market; but who is to be the Savior of the market is not yet decided by the special friends of the three absent magnates—Col. Mackey, Louis Schloss and Herman Zidig. So far as the average outside traders are concerned, they care very little who will offer himself a sacrifice so long as they make the money. They only "lick" when they lose and "the other fellow" makes. Points are now out for lower prices in the Comstocks, notwithstanding the outside have been steady sellers. Continued bad weather and big hear reports have disgusted many. Outside stocks have also been dull. The Tuscaroras have been easing off; the Quijotas were barely steady, while the Bodies appeared to be the firmest.

The Western Union Telegraph Co. ought to see the Commonwealth Mining Co. for damage, for each time the line gets to working a telegraphic shipment of bullion is sent from the mine, when down goes the line, probably to keep company with McGinty. A patron is informed that there is no truth in Charley Elliott and J. W. Pew having formed a trust mining secretariety under the firm name of Elliott-Pew Secretary Trust Co. Probably it is owing to Mr. Elliott's being secretary of so many of the Comstock mines and Mr. Pew of its outside mines that such a report originated, if it originated at all.

Owing to the heavy deposits of snow at Virginia City, only three mines, the Occidental, Justice and Alabama, are reported to be crushing ore. It is claimed that the others will resume crushing ore within a few days.

The net cash bullion output of the Crown Point mine in last December was over \$40,000, which paid up all indebtedness and allowed of the carrying over of a surplus into January.

A subscriber sends the following: "Will you please inform a stockholder if A. C. Hamilton, superintendent of Chollar, Potosi, Alpha, Exchequer and New York Con is paid a salary while he is traveling around the country? Also if Sam Jones of the Crown Point and Belcher is paid a salary from the assessments of those mines while he is visiting mines in California and Alaska? Also if Col. (?) Keating, of the Norcross and Savage, is allowed his salary of \$50 per month while he visits the Tuscaroras mines and spends at least one-half of his time in San Francisco? By answering the questions you will greatly oblige a stockholder."

In reply to the above we will state that a prominent mining official in this city, when asked if the superintendents drew salaries while absent on other business than that of the mines, said, "Why not? Of course they do. What do you take them for?" We know of quite a number of persons, the writer included, who would for less than one-half the salary agree to remain away from the Comstock all the time and write up the work going on in the mines besides.

News from the mines on the Comstock is difficult to get. If our previously received advices were reliable, the work in two or more of the mines ought to have either reached or will soon reach very interesting points. With mail communication resumed between San Francisco and Virginia City, we ought to get more bullish news, such as should favorably influence the mining share market. From the Tuscaroras the same old reports come to hand, which bring assessments. From the Bodies no news is at hand, but those who ought to know are very confident of good results following the change in the superintendence of Bodie; at any rate they claim that there are rich bowlders in the mine, one or more of which are liable to be run into at any time, and if reported favorably the stock could be made more active at higher prices. Of course these men are too honest to sell stock on a bowlder strike to outsiders—unless to collect assessments so as to run the mine. From the Quijotas good news continues to come to hand, but the stock does not advance; which causes persons to doubt the news even if it is given in official letters.

NO BULLION SHIPMENTS—Owing to the continued blockade of the railroads in the mountains, no bullion shipments have been received from the mines for two weeks past.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Jan. 9.	WEEK ENDING Jan. 12.	WEEK ENDING Jan. 15.	WEEK ENDING Jan. 23.	WEEK ENDING Jan. 30.
Alpha.....	95 1 00	90 1 25	95 1 00	90 1 25	95 1 00
Alta.....	1 25	1 25	1 25	1 25	1 25
Andes.....	50 75	50 75	50 75	50 75	50 75
Belcher.....	1 65	1 83	1 70	1 85	1 85
Best & Belcher.....	2 15	2 35	2 25	2 40	2 50
Bodie Con.....	25 00	25 00	25 00	25 00	25 00
Bodie Con.....	25 00	25 00	25 00	25 00	25 00
Benton.....	25 00	25 00	25 00	25 00	25 00
Blower.....	20 20	20 20	20 20	20 20	20 20
Commonwealth.....	3 10	3 65	3 40	3 85	3 50
Con. Va. & Cal.....	4 45	4 45	4 45	4 45	4 45
Challenge.....	1 10	1 20	1 10	1 30	1 40
Chollar.....	2 25	2 45	2 20	2 25	2 45
Confidence.....	3 25	3 25	3 25	3 25	3 25
Con. Imperial.....	25 30	25 30	25 30	25 30	25 30
Caledonia.....	1 50	1 75	1 50	1 75	1 75
Crown Point.....	1 50	1 75	1 50	1 75	1 75
Crocker.....	20 20	20 20	20 20	20 20	20 20
Eureka Con.....	20 25	20 25	20 25	20 25	20 25
Exchequer.....	20 25	20 25	20 25	20 25	20 25
Grand.....	1 50	1 50	1 50	1 50	1 50
Gould & Curry.....	1 30	1 40	1 30	1 45	1 40
Hale & Norcross.....	2 50	2 75	2 50	2 80	2 85
Julia.....	20 25	20 25	20 25	20 25	20 25
Justice.....	1 20	1 15	1 30	1 10	1 10
Kentuck.....	30 35	30 35	30 35	30 35	30 35
Lady Wash.....	30 35	30 35	30 35	30 35	30 35
Monoc.....	30 35	30 35	30 35	30 35	30 35
Mexican.....	2 15	2 45	2 10	2 30	2 65
Nevada.....	35 35	35 35	35 35	35 35	35 35
Norcross.....	1 00	1 15	1 00	1 15	1 15
Ophir.....	3 05	3 50	3 05	3 40	3 70
Overman.....	55 70	55 70	55 70	55 70	55 70
Potosi.....	1 65	1 85	1 60	1 75	1 75
Peerless.....	25 25	25 25	25 25	25 25	25 25
Peer.....	15 15	15 15	15 15	15 15	15 15
Savage.....	1 40	1 55	1 40	1 55	1 60
Sierra Nevada.....	1 40	1 55	1 40	1 55	1 60
Sierra Nevada.....	1 75	1 95	1 60	1 95	1 95
Silver Hill.....	30 35	30 35	30 35	30 35	30 35
Scorpion.....	15 15	15 15	15 15	15 15	15 15
Union Con.....	2 10	2 30	2 25	2 35	2 35
Weldon.....	55 75	55 75	55 75	55 75	55 75
Weldon.....	15 15	15 15	15 15	15 15	15 15
Yellow Jacket.....	1 80	1 95	1 70	1 95	1 95

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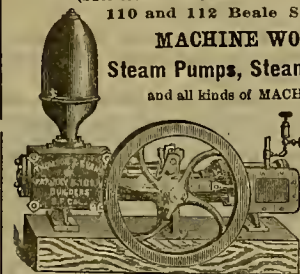
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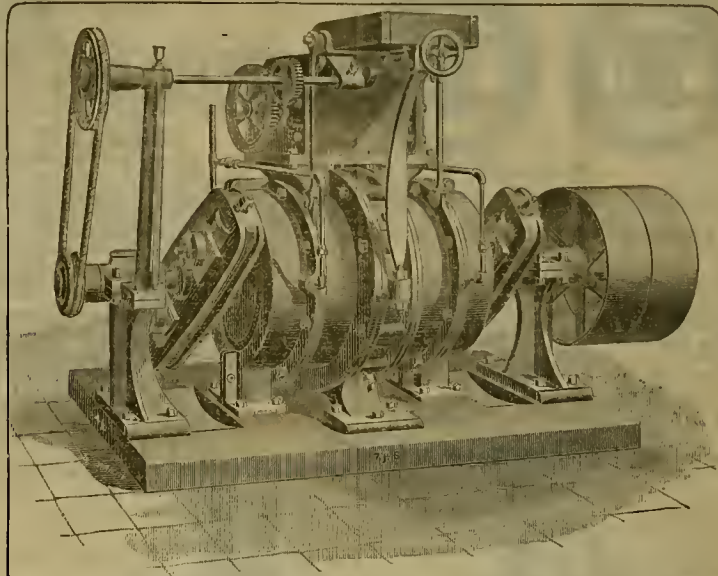
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This Mill, with a weight of less than 9000 pounds,
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IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS

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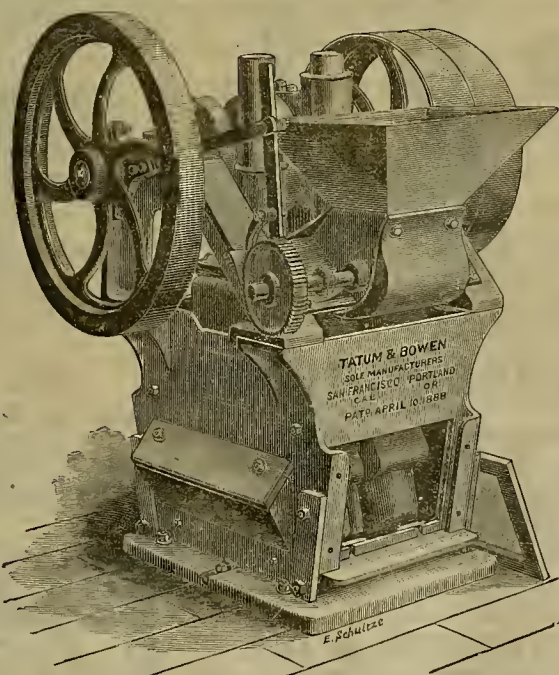
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Attached to each Mill
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The Mill is a closer Gold-Saver and catches a larger percentage of
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to 10 tons per day. Weight of Mill, complete, 6400 pounds.

We manufacture, to go with the Mill, an

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Power required for Mill and Rock Breaker, 6 H. P. SEND FOR CIRCULAR. Address

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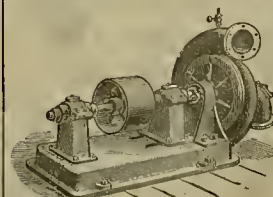
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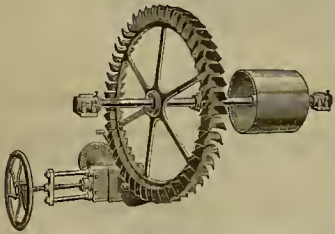


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For Water Supply Tanks,
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UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought
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GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MA-
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**HOMOGENEOUS STEEL, SOFT and DUCTILE,
SUPERIOR TO IRON FOR
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ALSO Steel Rods, from 1/4 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shape
Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths
STEEL RAILS from 12 to 46 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled
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HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

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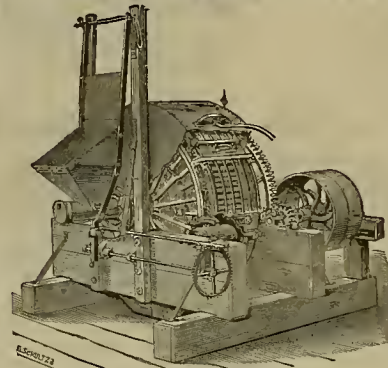
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Propeller Engines, either High Pressure or Compound,
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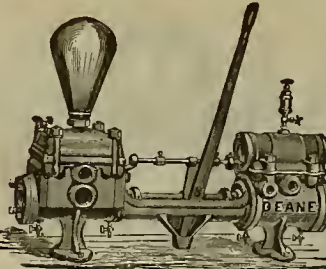
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Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

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Of Different Strengths as Required.

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FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blast-
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Zinc, Copper or Brass Screens for all purposes. Call
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COAL MINES OF THE WESTERN COAST.

A few copies of this work, the only one ever published
treating of Pacific Coast Coal Mining, have been ob-
tained, and are for sale at this office for \$2.50 per copy.
It was written by W. A. Goodyear, Mining and Civil
Engineer, formerly of the California State Geological
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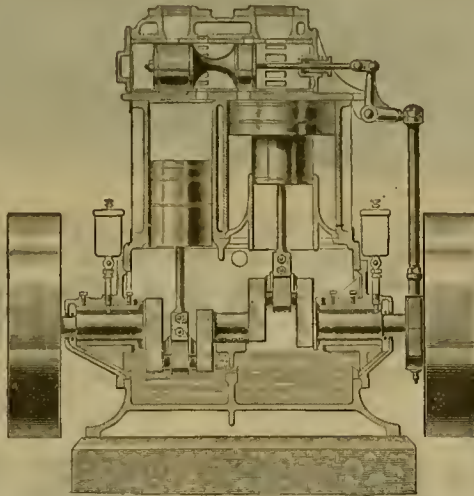
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GOLDEN GATE CONCENTRATORS,

GREATEST CAPACITY OF ANY CONCENTRATOR MADE,

One Machine Taking Pulp from 10 Stamps.



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21 and 23 Fremont St., San Francisco, Cal.

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Is beyond all question the most important improvement that has ever been made in this class of mining machinery. It will do more than twice the work with a given amount of wear than any other Crusher made, besides crushing so much finer that for mining uses, the capacity of the mill is greatly increased. It has the same relative superiority for macadamizing purposes, affording the cheapest and most reliable machine for this use.

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For SAVING GOLD!

IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER
AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates Replated, Bought, or Gold Separated. THOUSANDS OF ORDERS FILLED.

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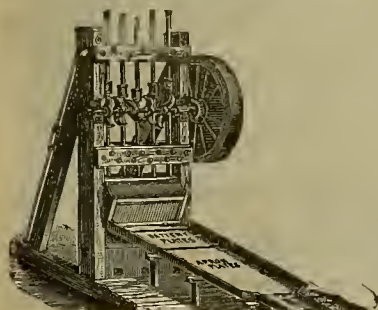
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SILVER-PLATED AMALGAM PLATES for SAVING GOLD
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PRICES GREATLY REDUCED.

Only Refined Silver and Best Copper used. Over 3000 Orders filled. Fifteen Medals Awarded. Old Mining Plates can be Replated. Old Plates Bought, or Gold Separated.

These Plates can also be purchased of JOHN TAYLOR & CO., Corner First and Mission Sts.

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Our Plates have been used for 20 years. They have proved the best. We adhere strictly to contract in weight of Silver and Copper. SEND FOR CIRCULAR.

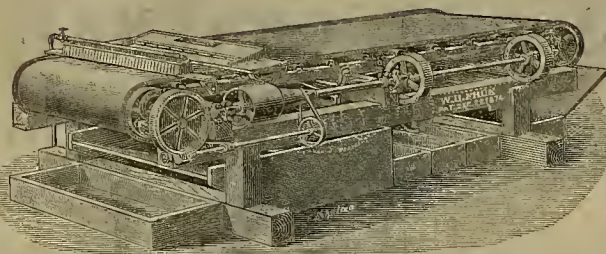
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The Best Ore Concentrator in the market, having double the Capacity and doing its work as close as the plain Belt machine, while its concentrations are clean. It is used in a number of Mills, the most notable of which is the Alaska M. & M. Co's Mill, where 24 Improved Belt Frues are taking the Pulp from 120 Stamps, crushing 350 tons per day, and is giving entire satisfaction as against 48 plain Belt Machines, taking the Pulp from the other 120 Stamps.

Price of Improved Belt Frue Vanner, \$900, f. o. b.
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Protected by Patents December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883; July 24, 1888. Patents applied for.

There are Over 2200 Plain Belt Machines now in Use.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.
DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly, THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

JOSHUA HENDY MACHINE WORKS,

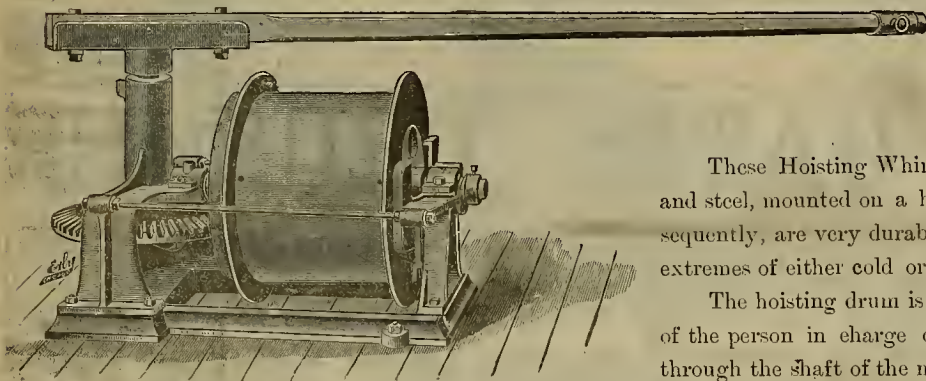
(INCORPORATED SEPTEMBER 29, 1882)

Nos. 39 to 51 Fremont Street,

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Manufacturers of NEW and Dealers in SECOND-HAND BOILERS, ENGINES, PUMPS and MACHINERY OF EVERY VARIETY.

"SENSIBLE" HORSE POWER HOISTING WHIMS.



These Hoisting Whims are built entirely of iron and steel, mounted on a heavy base plate, and, consequently, are very durable and cannot be affected by extremes of either cold or heat or climatic influences.

The hoisting drum is completely under the control of the person in charge of the hoisting or lowering through the shaft of the mine.



ROCK AND ORE CARS.

As the drum is entirely independent from the driving gears, the operations of hoisting, dumping bucket and lowering can be performed with the horse in constant motion, a feature not possessed by any other horse hoist in the market, and one that greatly increases their capacity by avoiding the loss of time due to stopping and starting the horse.

They are very light and compact, and can be packed for transportation by mules. Their cost of erection is very slight; two men, in half a day, being able to put one in place, ready to work.

With each Whim, working drawings are furnished, showing in detail the proper construction of Gallows Frame and foundation for Hoisting Whim.

We Carry in Stock the Following Sizes, viz.:

NO. 1.--

Capacity with One Horse and Single Line, 800 Pounds, 75 Feet per Minute.

NO. 2.--

Capacity with One Horse and Single Line, 500 Pounds, 125 Feet per Minute.

Weight of Machine, 1200 Pounds. Total Shipping Weight, Including Sweep, Levers and Sheaves, 1400 Pounds.

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ESTABLISHED 1852. INCORPORATED 1882.

Steel Wire Rope,

—OF ALL KINDS FOR—

CABLE RAILWAYS,
ROPEWAYS and TRAMWAYS,
Mining, Shipping & General Purposes.

WIRE,

BARBED WIRE,
WIRE NAILS,
WIRE CLOTH.

Full Assortment Always in Stock.

OFFICE:

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PATENT WIRE ROPEWAY,

For the Economical and Rapid
Transportation of Ore
and other material.

Erected by Us During the Past Fourteen Years in Spans of
200 TO 2,000 FEET.

Simple, Economical and Durable.

HAVE BEEN THOROUGHLY TESTED
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MINING AND SCIENTIFIC PRESS.

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VOL. LX.—Number 6.
DEWEY & CO., PUBLISHERS.

SAN FRANCISCO, SATURDAY, FEBRUARY 8, 1890.

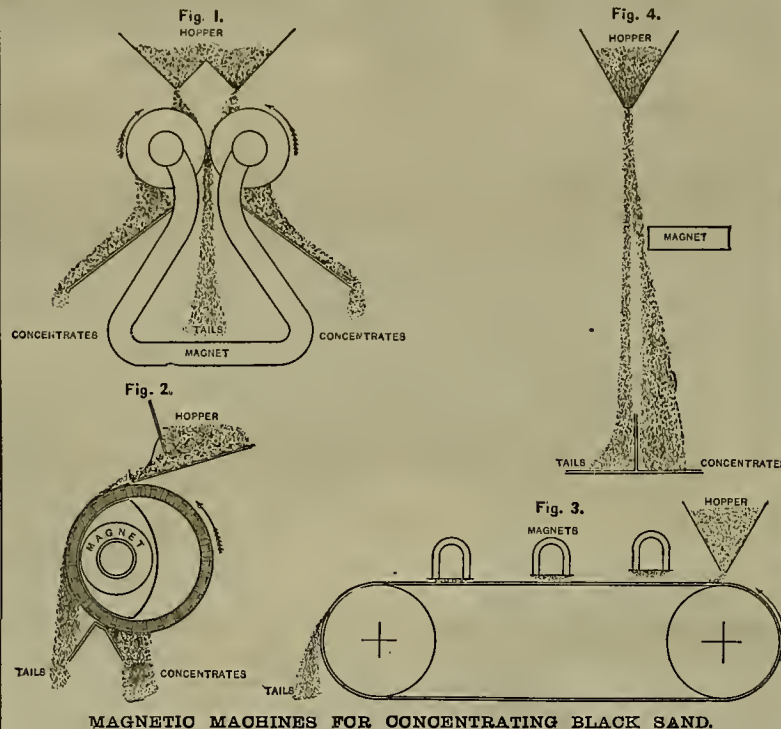
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Concentration of Iron Ore.

Last year John Birkinbine and Thos. A. Edison contributed to the American Institute of Mining Engineers a paper on the above subject, which gave the results of concentrating magnetites in several parts of the Eastern States. In their paper they described the various magnetic machines need for concentrating these ores. Fig. 1 shows the Buchanan separator, which consisted of a pair of rolls and a large horseshoe magnet properly wound (as shown in outline). It was employed in separating magnetite from the fine sea sand from the shores of Long Island sound, and an extensive plant was sent to New Zealand, where the sea sand carries a remarkable amount of finely comminuted magnetite.

A pair of these rolls has lately been operated at the Croton magnetite mines, near Brewsters, N. Y., by the Messrs. Cheever, to prepare concentrates from the waste-piles of lean ore. The ore, a dense magnetite, is reduced by jaw-crushers and Cornish rolls so as to pass through 16-mesh screens.

The Wenstrom magnetic Fig. 2 separator has a stationary field magnet and an armature barrel consisting of a number of soft iron bars, separated from one another by a non-magnetic material. The whole is bound together by non-magnetic end-rings. The bars are on away alternately on the inside to make one bar project only toward the north poles of the magnet and the next only toward the south pole. This gives each succeeding bar opposite magnetism. On each of the four sections of the magnet are wound 15 pounds of copper wire. An Edison dynamo furnishes a current of ten amperes and 33 volts. The ore is fed in the barrel from a hopper. The magnetite adheres to the bars of the barrel and is carried downward past the first delivery chute. Below the machine the bars, departing from the influence of



MAGNETIC MACHINES FOR CONCENTRATING BLACK SAND.

the electro-magnet, which is placed eccentrically, lose their power to hold the particles of magnetic iron-ore and they drop off. The particles of rock in the ore being non-magnetic drop from the barrel almost immediately and fall on the first chute shown in the engraving.

The Conkling magnetic separator is a belt machine of the general form indicated by Fig. 3, which merely shows the principle and not the detail. The ore is fed on a belt and car-

ried along under a series of belts, running at right angles to the first. These cross-belts pass between the magnets and the ore lying on the distributing belt, and may be placed at varying distances from the latter. As the ore, reduced to the proper size, passes along on the distributing belt, the magnetic belts, which may be influenced by magnets of different powers, pick up and carry to one side the magnetic particles of the ore, while the non-magnetic

portion of the gangue is carried off as tailings.

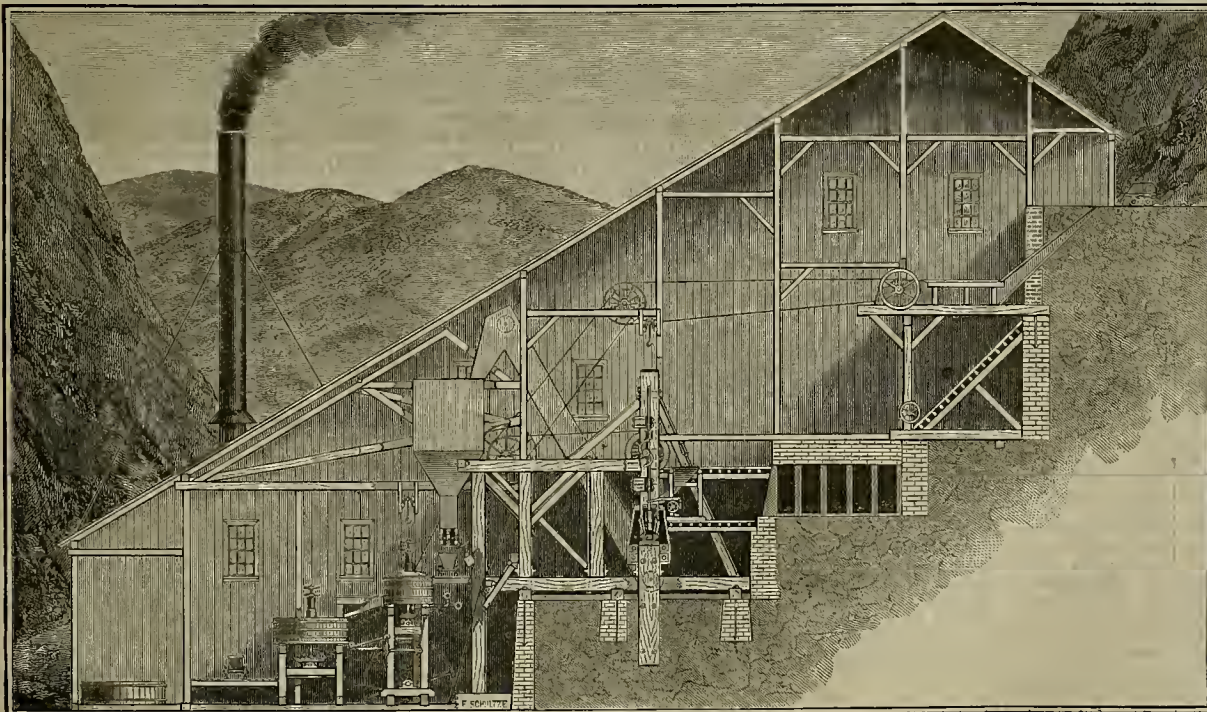
The Edison unipolar non-contact electric separator differs from the forms described in that it has no moving parts. Except such facilities for altering the relative position of the parts as are essential for adjustment in treating different ores, or are required to secure certain results, all parts of the apparatus are fixed. The separator, which is illustrated by Fig. 4, consists simply of a hopper, a magnet and a partition to separate the concentrates and tailings into different receptacles. The illustration shows but one hopper, but in practice the ore can pass on each side of the magnet, thus doubling the capacity. The simplicity of the construction, which is the result of patient and thorough investigation of many different designs and methods, will commend itself.

The ore after being properly crushed and sized is placed in hoppers, from which its discharge is controlled by bars closing slots which extend the length of the hopper. These slots are made adjustable so as to suit the size to which the ore has been reduced. The hoppers are adjusted to appropriate heights above the magnet.

The material falling from the hopper passes the face of the magnet, but does not touch it. The distance of the magnet from the vertical plane of the falling material is so chosen that its attraction causes the magnetic to separate from the non-magnetic particles sufficiently to alter their direction. By reason of the force of gravity, this deflection of the trajectory, while sufficient to draw the magnetic particles away from the non-magnetic, does not draw them against the magnet, but should any ore accumulate on the magnet it can be instantly dropped by breaking the current. The exact distance, however, is maintained so that none can stick to the magnet. Owing to the altered trajectory the magnetic ore falls upon one side of the partition, which is so adjusted as to secure the best result, while the gangue material drops upon the opposite side.

In many ores there are particles of magnetite attached to some non-magnetic material which prevents them being carried over with the concentrates, but cause them to be drawn sufficiently from the vertical to separate them from the tailings, or when the stream of material permits several layers to pass the magnet simultaneously, particles of non-magnetic material may retard the movements of magnetic portions so that they do not pass into the concentrates. In such cases an intermediate grade is collected called the "mugwump," because it is neither concentrates nor tailings. This mugwump may be returned to the hoppers or passed before a second magnet. A series of magnets may be arranged so the concentrates, mugwumps or tails are each subjected, as in other machines herein described, to repeated magnetic influence, thus insuring more perfect separation, and maintaining the capacity which is a strong point of the Edison apparatus. The capacity of a two-face machine is 300 tons per day.

As but ten members of the Academy of Sciences attended the meeting on Monday last, an adjournment was taken for want of business and a quorum.



SILVER MILL, FOR CRUSHING ORES DRY.—See page 93.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Copperopolis.

The New Copper Smelter.

[From Our Own Correspondent.]

The snow and accompanying rain has retarded mining operations throughout the State. Oslaveras county, with Copperopolis included, has come in for its share of "the beautiful." Notwithstanding the uninterrupted storm, operations have been continued right along, while the outdoor work has necessarily been checked. The superintendent, Mr. J. A. Ferson, has found plenty of rainy-day work for all hands. The works of the company are now on so extended a scale that it is but a shift from one job to another on the part of the men, but the results are not the same at present, as the storms put out the fires in the roasting-piles and prevent the completion of the smelter. This smelter is "Lakes" patent blast furnace of the Orford Copper Co. of New York."

The manufacturers claim superiority over other copper smelters by reason of the peculiar construction of the "Orford." This consists mainly in an air-box underneath the hearth, thus saving the making of immense copper hot-toms and consequent expense in removing the same; the greater ease with which the smelter can be regulated, and the increased output. The 43x11-foot furnace has a capacity of 200 tons of ore a day (24 hours), and an average capacity of 125 tons a day, handling the ores of the Union mine at a cost of \$4.75 a ton. The smelter is not an experiment, but is in successful operation at this time at the Orford Copper Works, N. J., Orford Nickel & Copper Works, Capleton, Conn., and the Butte Reduction Works, Montana. The owners of the patents show their faith in their smelter by guaranteeing its successful and profitable operation on ten-per-cent ore. Of course these results are not obtained by the merits of the smelter alone, but are due in good part to the knowledge of the manager in charge.

On this plant Mr. F. F. Hunt, formerly of the Butte Reduction Works, has been placed in charge, and everything goes to show that under him the smelter will do all that is claimed for it.

The smelter will, for the present, be used only as a concentrating plant, making copper matte of 45 per cent, which will be shipped to the Orford Reduction Works in N. J. This smelter can be set up in New York for \$2500. The Copperopolis smelting plant, when complete in all parts, will cost \$15,000 to \$18,000.

All of the ores of the mines carrying less than 10 per cent of copper will be roasted and leached; those over 10 per cent smelted. The smelter and roasting and leaching plant will handle 300 to 400 tons of ore a day, and give employment to an average force of 150 men. Mr. Ferson has kept a force of miners steadily at work in shaft No. 1, sinking the same an additional 140 feet and running levels, everything being pushed as steadily and rapidly as the weather will permit. But for the long siege of "mistiness," the Copperopolis plant would now be in full operation; and Mr. Ferson, together with the owners of the mine, rewarded by a handsome output from the best equipped copper plant in the State.

E. H. SCHAEFFLE.

Murphy, Cal., Jan. 25, '90.

Inspection of Mines.

EDITORS PRESS:—In a late issue of the MINING AND SCIENTIFIC PRESS, I notice an article entitled "Prevention of Mine Accidents." The writer is certainly not well posted when making the assertion that "we have no governmental or State officials to inspect mines and see that proper precautions are taken against mine accidents," unless he refers only to California and Nevada. That all the large coal-producing States have corps of inspectors for the past 15 years is a well-known fact. Of the metalliferous mining States, Michigan has six inspectors in the iron and copper producing counties; Missouri one, whose duty demands of him to inspect the lead and zinc mines of that State; Montana has recently appointed a State Inspector, and Colorado has a State Inspector of Mines and three assistants.

To prove to you that the office is no sinecure, I would state that in the last six months of '89, in my official capacity (Inspector of 3d District of Colorado) I visited and examined into the methods of working over 200 mines. While the majority of the mines were found to be working under intelligent management, and with a due regard for the health and safety of the toilers underground, still many were found in bad shape, and demands upon owners and managers for betterments were made, and have been complied with.

Statistics carefully prepared prove what is not generally known—that there are far more accidents to the number employed in metalliferous mines than in coal mines. A miner injured here, and killed over there, in the aggregate make a list, if compiled annually, that is startling; and the question arises, how can those accidents be prevented? That many so-called accidents are better termed suicides is a fact. For instance, many who are

injured and killed by explosions in our mines, contributed toward the result by acts of their own carelessness. Very few mine managers favor accidents of any kind, but that they do often work their mines without any regard to proper ventilation, and thus compel the workmen to breathe the poisonous gases given off from the strata and from decaying timbers, explosions of powder, candle smoke, and so forth, is a fact also. More miners die from being "leaded" and "miners' consumption," from the lack of pure air, than from all accidents in the mines; and much good in this respect follows the passing of wise inspection laws. The law in this State is in its incipency and does not meet fully the requirements of the mining industry of Colorado. Many valuable sections of the bill introduced were cut out in its passage through the Legislature; but that good will be accomplished by the imperfect bill passed all will readily agree.

GEORGE KISLINGBURY,
Asst. Inspector of Mines.

Silverton, Colorado.

Californians in Antwerp and London.

EDITORS PRESS:—You can hardly realize how happy we are that we are in a land where the English tongue is spoken, and are understood and can understand. For nearly two months we have been where not one in a thousand could communicate to us in an intelligible manner. It has been by either signs, pantomime, demonstrations, exemplification, or broken jargon. We have ridden whole days with intelligent foreigners, through their own country, who, no doubt, were well informed of its history and doings, and all that some of them were able to say in our language was "sheep," "knife," and such words.

We had Gaze's tourist tickets, which saved us a great amount of trouble. Our tickets were mostly printed in English on one side, and the language of the country in which we traveled on the other. The names of the places through which we traveled are neither spelled nor pronounced as we spell and pronounce them, and it is almost impossible to tell when you are at a place where you wish to stop from the guard's pronunciation. All five of us had to frequently consult our map, tickets, and name of the station pretty sharply, before we could fully decide whether to alight from the car. It frequently resulted in sharp and amusing discussions. It seems so good to get where the English language is spoken that we feel we are almost home again.

We staid in Antwerp (Avers) one night. Antwerp is no such city as Brussels—less life, less business, poorer class of buildings, dirty streets, not so well-dressed citizens, and not in such good circumstances, and do not show such thrift. The Grand hotel that we stopped at was three times too large for the amount of business they were doing and seemed to be an elephant on their hands. They charge you so much a day if you take wine at dinner; if not, they charge you a little more for the room. If they cannot make their profits on wine, they will make it up in the room.

When I was paying my bill a temperate Englishman was reading a lesson to the proprietor for his method of doing business. The landlord claimed there was more profit on wine than hoard. I think that was an honest and candid statement. They charge for a common kind of table claret not less than about \$2.50 a gallon, 3 to 3½ francs a bottle. That seems rather dear when it can be bought in California for about 15 cents a gallon by the wholesale.

Antwerp has a fine, large cathedral with lofty and well-shaped spire. The interior is built after the same style as most of those that we have seen—high arched roof supported by large fluted columns. It has some marvelous wood-carving, saintly pictures and numerous crucifixes in all parts of the church.

A good many devotional persons were present to listen to and participate in high mass, which was being repeated by five or six priests in their wonderful tinselled robes.

There is a very good picture gallery here, and, to my notion, some of the best pictures I have seen on this side. They are large, bold and more life-like, and show splendid coloring. Rubens, the great painter, has quite a number of his works here. One of his masterpieces, "The Descent from the Cross," is in the cathedral.

High earthworks and walls are built around the city. The bank of the river next the city is walled up with large cut granite, making a splendid dock for nearly half a mile, covered with iron and glass sheds. They have the largest and best conditioned horses here that I have seen in any country. They are used on trucks to haul freight and coal around the dock. The most degrading thing I saw here was two large young girls, 18 or 20 years old, unloading a car of fruit in baskets and putting them 50 yards away under a shed. A young, stout man was on the car handing the baskets to the girls. I should judge the baskets weighed 50 or 60 pounds. Longshoremen were working all about them on oars and boats. The girls did not seem to mind it more than they would to carry a handful of wood or coal into the house. I do not think the girls were employed at the dock, but came in with the car from the orchard to unload it.

Some 200 yards back and parallel to the dock is a channel half or baron nearly a quarter of a mile long and 200 feet wide, dug out and walled

up with large cut granite for canal-boats, schooners and sloops to load and unload. There are two or three sets of heavy flood-gates that close the water in at high tide and bring the vessels near the top of the dock; otherwise it would be difficult to discharge their cargoes on account of the extreme high and low tide. Coal and mussels seemed to be the chief traffic. I saw several cargoes of the black mussels being unloaded into sacks, harrows and carts, which the women draw around the streets, and when they find a purchaser will stop their cart and open the mussels the same as oysters. The little children around the dock go for them just as ours do for gum. I learn that they will spoil in a few days unless kept in salt water. They seem to be used as a substitute for oysters.

Antwerp is a famous place for making the dogs work, and I must confess that I had but little idea of the amount of work that could be got out of a dog, and the dog enjoy it. I saw three dogs to one cart, and they running and barking as though it was real fun for them. They have a little cart with shafts, and when the master is gone too long with his milk they will lie down and rest.

Most all dogs on the continent are muzzled with leather or wire, and are led when on the streets. They have some of the largest dogs over here I ever saw.

Crossing the Channel.

Thursday was very rainy and windy and we dreaded crossing the channel in the night, as we had to leave at 6 o'clock P. M. The Oolchester was a good-sized, strong vessel, and I believed she would take us over safely even if she did shake us up some. As the sun went down, so did the wind somewhat. The arm of the channel makes up to Antwerp, a distance something like 20 miles, and it was about 12 o'clock before the vessel began to rock us to sleep. I had a good berth and did not pay much attention to her rocking. The ladies did not enjoy the trip very much, and looked pale and restless the next morning.

In England.

We arrived at Harwich the next morning at 5 o'clock, about 90 miles across the English channel. Took train at 6, and arrived in London at 9 o'clock A. M. There had been a good deal of rain of late, and the trees and grass looked green and fresh as spring.

We return to hedge fences and leave most of the tile roofing. We have left the flat country, and now we find it rolling, which is a pleasant relief. We find a good deal of grain and turnips in the fields; some few apple orchards. We see a good class of buildings, and but little timber land. The tall brick chimney is seen all over England and Scotland, and it indicates manufactures and industry.

London appears to be just as large, just as busy and mysterious as she was six weeks ago. I can hardly realize that I am in such a large city—the very financial and business center of the world. There is a market and a price for anything and everything that is capable of moving or having a being.

I had a desire to see the Queen's horses, kept at Buckingham palace, on exhibition between 2 and 4 each day. I had a ticket of admission during the Shah's visit in London, but the horses and men were kept so busy the horses and coaches could not be kept in a condition for exhibition, so visitors were excluded for a few days. Finally, presenting my ticket to a large, well-fed and well kept man with tall hat with rosette, red coat and knee breeches, signed my name in a register-book under a San Francisco man who had just passed the rounds before me.

This red-coated man signaled to a tall, young, fine-looking man in black to show me around, which he did in a gentlemanly and intelligent way.

The horses were kept in a number of stables, and the most I saw in any one stable was 36. These 36 were bays with black points and about 16 hands high, and groomed until they glistened. No two could be picked out but what would make good matches. Another stable contained 10 or 12 bay saddle horses for grooms, servants and outriders.

The large carriage is a marvel of size and workmanship. It takes eight horses to pull it, is 120 years old and took five years to build; two kings and Queen Victoria rode in it to be crowned—Victoria when she was 19. One of the great masters from Italy came over and painted the panels, which are said to be unsurpassed in artistic skill and seem quite fresh now. The carriage part rests on thorough braces, and is so nicely poised that a person with one hand can rock it with ease.

There is a wide, long inclosure with tanhark floor to exercise the horses on in bad weather. I have not seen a haly horse, mule or dog, or a runaway on this side. I have seen horses stuck with overloads, but they would pull every time they were called on. I have seen horse cars operated in every city that we have visited except Venice and have not seen one car run off the track. The upper side of the rail to a street car is divided by a groove running the entire length, the wheel resting on the larger part of the rail, while the flange or rim of the wheel runs in the groove, the smaller part of the rail being on the inside. By that means the car never runs off the track. The track lies level with the street and carriages pass over it without damage or any perceptible difference. Most every city has some little difference in the mode of collecting fares. The hell-

punch method seems to be used as much as any kind. Most every one gives a small card as receipt, with the amount paid printed on it.

I was in London during the great dock strike and saw them parade the streets several times with their banners, bands of music, bundles of bones tied to sticks suspended in the air, and a blockade of London bridge, so that the traffic of teams and buses was suspended for a long time. When you take into consideration the thousands of teams that pass over London bridge every hour, you can judge something of the distance the blockade extended on either side.

I was sitting on the top of a "bus" on the south side of the Thames looking on as patiently as my nerves would admit during the passage of this throng. The men seemed well dressed, and looked and acted like intelligent men, and made but little disturbance for such a large gathering.

Quite a body of soldiers followed them up, to quell disturbance, I presume. As near as I could learn, I concluded the strikers were justified in making demands for more pay for their work.

Hundreds of vessels were in and coming all the time with cargoes on either side of the river and at anchor in the stream, which could not be unloaded for want of labor. It appeared the dock-owners have invested so much in the docks that they do not receive the dividends they desire and were trying to make up from labor.

We left London at 2 P. M. for Liverpool via London & Northwestern road, a distance of about 200 miles, and arrived at 6:23 P. M., 4 hours and 23 minutes, with three stops. It was good, healthy riding when a man wants to get a change of fresh air.

I did not suppose there was so much grain grown in England. Some of it lay flat on the ground and grass growing up through it. The larger proportion was in shocks, but a good deal was bound, but still lying on the ground. It has been very wet since harvesting began, and farmers have not been able to put their grain in the stack yet. The fields looked green and beautiful. I think they sow olive with the grain, as I see it coming up in fine style in all the grain-fields. I should think the grain was wheat, barley and oats, but we went so fast through the country it was impossible to tell.

On Saturday we took a run over to Dublin, via Holyhead, an extreme point that makes out from Wales. It takes a little over four hours from Liverpool to Holyhead on the cars, and about the same time on the boat to Dublin. The weather was fine and water smooth for the Irish Channel. Dublin is quite a business place, and a vast amount of money has been spent on the seawalls, lighthouses and walling up the banks of the River Liffey for a long distance through the city. She has five docks, where they close the vessels in at high tide the same as Liverpool.

In the streets of Dublin are several statues and columns of some of Ireland's celebrated men. The old Parliament House from the outside looks like a Roman amphitheater. It is used now for the Bank of Ireland. For some distance around this square every other building seems to be occupied as an insurance office.

I thought I had seen poor people enough in Liverpool, bare-headed and bare-footed women and children, but this surpasses everything seen before. How a city will allow its unfortunates to walk its streets in such abominable filth and rage I cannot conceive. Perhaps these few are an exception, for most of the people were well dressed and looked like industrious people.

I should never expect that I was treading on the green turf of old Ireland, or in the sound of the twang of Erin's harp, by the brogue or pronunciation of its citizens. I did not bear as much brogue as I would in one day in Sacramento.

The fashionable or most used conveyance here is the jaunting car, or "outside." It is built over two small, stout wheels. Four persons sit over the wheels, with backs to each other, facing outward; the other two with backs to each other, one toward the horse and the other to the rear. They ride very easily and every stranger wishes to try one. I became quite interested in the city and regretted very much that we could not take a little more time to look around here and through the country. We went back on Monday in the same boat, the Rose. The weather was not very pleasant; cold wind and fog, and a little motion to the boat, which made some of the ladies look over the side of the boat and make up awful faces to some imaginary demon down below.

We performed the feat of going around the river Mersey the same as you would go around a log. We first went under it in the cars through the tunnel, then we braced ourselves up a little with some tea and lunch at Birkenhead and then returned on the ferry-boat. It took about three minutes to pass through. It is a double track arched over with brick. Ferry-boats and ships passed over our heads as frequent as horse-cars in the streets. A great deal of walking has to be done at either end to get down or up from the cars. The fog is so dark to-day that I had to move up close to the window to see to write, and the merchants on the other side of the street had to light their gas. I suppose this is what is called the black fog of London. It is so near a rain that about half of the people are carrying umbrellas.

This is the last letter I shall send to the

PRESS from this side. If they have served to amuse or instruct its readers, I shall feel fully compensated for my trouble. These letters have been written more as a matter of duty than anything else. If any of my fellow-Grangers should make a similar tour, I should most certainly expect them to give their impressions of the country and people to their fellow-members left behind.

I hardly know what disagreeable things there may be in store for me arising from writing these letters. A part of one of my letters was published in a Glasgow paper and cut out and underlined and sent to a friend of mine for me to see.

The press and my friends have noticed me, and why cannot I take the same consolation that a man did when he boasted to his companion that Gen. Jackson had spoken to him during the procession to his inauguration. One asked him what the General said to him. The General told him if he did not get out of his way he would allow him to sit on the toe of his boot standing up.

We expect by to-morrow night at this time the how of the good ship City of Rome will be

The Olive in California.

There is so great interest at present in the growth of the olive in this State, because of the notable success attained by the pioneers in this specialty in California, that the views which we present on this page will be welcome to many readers. When we speak of our pioneers in olive culture we do not mean the *padres*, though they were pioneers *par excellence*, and not only demonstrated the success of the olive on this coast, but secured in some way a variety which now bears the name of their establishments and does not yet yield the palm of excellence to other later-coming varieties from Europe, although it may have to share the honor with them. Though the *padres* did grandly under their conditions, it remained for another race of pioneers, about a century later, to bring olive culture upon its present basis commercially and industrially. While we recognize Cooper of Santa Barbara with his characteristic care in investigation and liberality in investment, and the Kimballs

newer plantations. It is the practice to plant vines and peaches between the rows of olives, with the idea of giving the latter the whole ground when they need it. The appliances for oil and wine making on the farm are well adapted to the purposes, and the establishment has a reputation far and near for enterprise and intelligence in its management and development.

New Mexican Camps.

Cooney Camp is in the southwestern portion of Socorro county and has a number of valuable mines, but there is a need of mills to reduce the low-grade, free-milling ores. Klagston is a bustling mining-camp about seven years old. From the Lady Franklin mine, one of the half-dozen mines on the hill, over a million and a half of silver dollars have been taken, with many thousands in gold out of mere prospect-holes. From the Comstock, adjoining, while running a tunnel to prospect the claim, a chamber yielding \$350,000 was found. Immense bodies of low-grade ore, and much high-grade,

being milled, yield an amount of treasure exceeding that which has already made the property famous. The low-grade ores have almost been valueless, and it was for a long time a positive loss to attempt to treat them. This defect has been remedied, and Mr. Bremen is now saving 90 per cent of the assay value of the ores, which leaves a fine balance to the credit of the mine after deducting the expense of mining, transportation and milling.

The Monarch, at Lone Mountain, by reason of the extended and continued development, is rated as a leading property and belongs to Frank Bisbee & Co. Monthly shipments are made, the average grade of the year's shipments being considerably over \$100 per ton.

Black Hawk district has a number of producers; among them the Blue Bell, Alhambra, Rose, Hobson group, Red Cloud, Good Hope, Horn Silver and Silver Klag.

East camp, about four miles in an easterly direction from Carlisle, is rapidly coming to the front as a producer. The Nagget mine is proving to be a first-class mine. Cook's Peak has been coming to the front rapidly during



VIEWS ON THE QUITO OLIVE AND VINE FARM, NEAR LOS GATOS, IN SANTA CLARA COUNTY.

headed toward the West, and may she not stop until she lands in New York. D. FLINT.

GEN. BIDWELL IS REMINISCENT.—"I have no recollection during a residence of nearly 50 years in California," said Gen. Bidwell, "of any rainy seasons equalling the present one to date for rainfall, snow and amount of cold weather, with the possible exception of 1841-42 and 1849-50. The highest water I ever saw in the Feather river was on April 1, 1853. I was in Marysville at the time, and the water then stood about three feet on the present site of the Western hotel, at that time the highest ground in the city. This was before the era of hydraulic mining, and placer mining had not affected the stream to amount to anything." —Chico Enterprise.

A METAL BILL.—A bill introduced by Representative Thompson of Ohio provides that copper, lead and nickel may be imported in ores, bars, etc., for refining, free of duty, provided that an amount of copper, lead or nickel equivalent to that imported shall be exported within six months in a refined state.

CONGRESSMAN MORROW has introduced a bill to relieve the Union Iron Works of the penalty incurred by the cruiser Charleston not coming up to the required 5000-horse power. The penalty amounts to over \$33,000.

of San Diego, with their well-known seamen and energy, as earliest claiming public attention by their achievements with the olive, we come next to El Quito in Santa Clara county, as a leading olive-oil producing establishment. There are, of course, olive plantations away from the Missions older than any we have named, but their owners did not regularly use their fruit as a commercial product.

The pictures upon this page give the reader a partial view of the olive plantation upon El Quito olive and vine farm, the property of E. E. Goodrich, situated in Santa Clara county, about 3½ miles from Los Gatos and eight miles from San Jose. This farm, comprising about 80 acres, came into the possession of Mr. Goodrich in 1882. There was at that time a number of old olive trees growing on the place. A view in the old orchard is given in the lower right-hand corner, and upon the left is another old tree standing in the midst of newly-planted ones. This tree was 16 years old at the time the photograph was taken. Mr. Goodrich has been obliged to renovate his older plantation; the trees set at 16 feet apart soon interfered with each other's progress and were thinned by removing alternate ones. Recently Mr. Goodrich has been doing much grafting in introducing new varieties, and has thus given new heads to many old trunks.

The landscape at the top of the picture gives something of a general idea of the lay of the ground on El Quito farm and the extent of the

are found on Cave and Garfield creeks, at McCann's camp, around Danville, and the Ingersoll group. Rich flat and well-defined vein are found on nearly every mountain-side. The North Peroha crosses the belt and exposes mineral all the way for the five miles of its course. From the Virginia group down about midway is the town of North Peroha, immediately southeast of which are the Eclipse and Charm group of mines. At Gold Hill there are some 50 gold and as many silver ledges, and the great need of the camp is a custom mill, that will save the ores to within 85 per cent, and we guarantee the founder a fortune in a few years. It would impart a new impetus to the miners and inspire their hearts with renewed energy.

Chloride mining district, as applied to the "flat" and surrounding hills, is distinctively appropriate, owing to the fact that a major portion of the values contained in the mineral products of the Bremen group, Providencia and other properties, consists largely of chlorides of silver. From the date of discovery up to date Chloride flat has been a constant producer, and the output from the Bremen properties is but little short of three and a half millions of dollars. The ore, as a rule, does not lie deep, and hence the cost of mining has not been so expensive as in less favored localities, and it is within the bounds of reason to assert that the developments of the past year in the Bremen mining estate will undoubtedly, on

the past two years as a producer and is now in shape to make a fine record for itself and the county. The ore is usually of a lead character, but averaging from \$60 to \$90 per ton in silver. —Silver City Enterprise.

STUDENTS OF MINERALOGY.—The attention of the secretary of the State Mining Bureau has been occupied for several days past in explaining the wonders of the mineral world to the young ladies of the High School. The teachers have recommended the study of mineralogy, and the young ladies are availing themselves of the splendid collection at the museum of the Bureau.

DOWN A SHAFT.—On the 30th ult., during the excitement caused by a fire in the hoisting works of the Quaker City mine at Chili Gulch, Edward Hanford, a carman, ran his car into the shaft, and was instantly killed by falling with it. Four men who were working at the bottom of the shaft escaped being crushed to death by the car becoming wedged in and stopping a short distance above them.

THE discovery of gold on the San Marcos creek, a few miles northwest of Paso Robles, continues to create considerable excitement. Prospectors are getting good returns panning out in the creek bottom and the neighboring gulches, and in two cases promising ledges have been uncovered.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

ZEILE.—*Ledger*, Feb. 1: The water has been very troublesome at this mine since the last storm. For several days the water-tank was kept going steadily day and night, and still the water gained on them. They hoisted at the rate of 130,000 gallons per day. In an ordinary season 50,000 gallons is considered an unusual flow. This constant activity of the water bucket has necessitated hanging up 20 stamps of the mill. The other 20 are kept going on rock hoisted from the other shaft. The flow of water has materially decreased the last few days, and if the weather continues fine everything will soon be running full blast.

KEYSTONE.—At this mine water is being hoisted out of both shafts; indeed nothing else is being done except taking out water, and still it is all they can do to keep the water from gaining. It is reported that good rock has been found on the 1400-foot level, in the drift running south. How much of a ledge this is cannot be known as yet. The prospecting operations were stopped to devote all energies to keeping the water out. The woodpile is getting low; enough to run till March; the outlook is that they will be run extremely close.

MISCELLANEOUS.—The pipe which carries water to the Drytown Consolidated mine was carried away by the flood, and brought the operations to a standstill for several days. The McKenzie Bros. mill near Irishtown has been started again with water-power. The Gover mill has been kept running with 20 stamps. The water is troublesome, but they have been able to handle it so far without hanging up the stamps. At the Kennedy they are hoisting 175,000 gallons of water per day. They are well fixed to handle water, and manage to keep 20 stamps of the mill going steadily. Supt. Tibbitts reports that the ten-stamp mill of the Sutter creek mine was brought to a standstill this week on account of heavy landslides occurring on the Amador canal. Stopping has been in order above tunnel level. Ore-bin now full. Mill will resume crushing Sunday.

MINES AROUND IRISHTOWN.—*GARDINER.*—Cor. Amador *Ledger*: The Gardiner mine has again resumed operations. Since January 15th the weather has been such as to necessitate stoppage for a few days. Last Monday the old hands resumed work. The intention is to crosscut the ledge, to ascertain its full extent. Indications point to the existence of one of the finest ledges in Amador county. The tunnel is running between two ledges, namely, the Faugh and Union. On the hanging-wall there is a fine-looking ledge, and on the footwall is the Union, with indications as promising as could be wished. Prospects taken from this ledge have yielded satisfactory results. With the return of good weather, there is every reason to look for steady, progressive work under the supervision of James Gleason.

MCKENZIE.—Situated on the creek, below the Gardiner, is the McKenzie mine, one of the most favorably located in this vicinity. Owing to inclement weather, it was brought to a standstill for want of wood. The mill, however, has again started with water-power. There is rock enough to keep the stamps going for 30 days, and it is said to be rich enough to clear off all incumbrances on the property, as well as pay running expenses for some time to come.

REED & MCKAY.—This mine has been at a standstill for some time, on account of a controversy between the owners; but there are hopes of a speedy settlement. Mr. Reed expects to commence operations as soon as the weather will permit.

THE REED & ASKEY is about 1 1/4 miles from Irishtown. Some of the richest rock ever seen in the county has been extracted from this mine. Owing to bad communication between mine and mill, everything is idle until the roads become passable for teams.

LAVERZO.—The rock assays from \$15 to \$20 per ton, with an output of from 25 to 30 tons per day. With a little capital to provide easy access to the mill, this ought to develop into one of the best paying properties hereabout.

LAST CHANCE.—This mine is owned by Messrs. Dwyer, Conlon and Fahey, and is an extension of the Going mine. During the last few days an excellent looking body of ore has been opened. The ledge can be traced for 600 or 700 feet from the tunnel, and shows a fair prospect throughout. The writer saw a test made from samples from the claim, yielding rich-looking sulphurets and a good showing in free gold. The property was discovered by Patrick Fahey, one of the oldest miners in the county, and formerly foreman of the Going mine.

Butte.

BIG BEND WILL BE WORKED.—*Oroville Mercury*, Feb. 1: Supt. Beaton of the Big Bend mine has returned from Arizona, where he went to meet Dr. R. V. Pierce, president of the mine. Mr. Beaton states that just as soon as the river goes down sufficiently, a force of 100 men will be put into the mine and worked as long as the season will permit. The splendid results of last season's work with a small force has greatly encouraged Dr. Pierce, and he hopes that this season's work will prove profitable in proportion to the increase of men.

NUCKET.—Geo. Carr of Miner's Ranch came to town yesterday and brought a nugget of gold picked up in a ravine near that place by a miner. It was pure gold, about the size of an apricot, and he sold it in the bank of Rideout, Smith & Co. for \$45.20. The rain had uncovered it, and the lucky man came along to find it. Such things happen very frequently along the ravines leading to the Feather river.

THE GOLDEN GATE MINE.—Work has been going on at the Golden Gate mine, near Oroville, all winter. "We are paving the way for an early commencement of active operations at the mine in the spring," said Major Frank McLaughlin, the energetic manager. "In a few months a large force of men will be set to work preparing and gathering the rock for the head-dam, and when this work is fairly started the gigantic flume will be again built. Surveyor McGann has just completed a survey of the route for the immense flume. It will be constructed with less bends and angles than the one we had last season; will be much stronger and carry 50 per cent more water. I have contracted with the Sissons Lumber Co. for all the lumber we shall use. Yes,

we are ready for an early start. Our plan of operation is laid out, and we know just exactly what we can do; that is, so far as the engineering skill of man is concerned. But we don't pretend to be able to handle the elements; that is beyond the power of man. But we hope for a good season, so that we can once more see the bottom of the Feather river; and not only see its wealth laid before us, but liberally help ourselves from its treasures of gold."

Calaveras.

WORK FOR THE DEAD BODIES.—*Angels Echo*: We have given, and shall continue to give, the public some idea each week of the work going on in the Utica mine for the purpose of getting out the dead bodies buried beneath the cave. A large drift is being run in the south end of the mine, in the direction of where the dead bodies are supposed to be. The work is being prosecuted as rapidly as possible, under the unfavorable circumstances, and no stone will be left unturned to exhumate the bodies at the earliest possible moment. The management seems every bit as much concerned and as anxious to get the poor fellows out and give them a Christian burial as the public, or even their nearest friends and relatives. Since the above was in type one of the dead bodies has been unearthed and brought to the surface. The body is supposed to be that of James Casey.

El Dorado.

SLATE.—*Placerville Observer*, Feb. 4: The Strahle Slate Co. are shipping a carload of slate from the depot here. The railroad company and the slate quarry companies have made arrangements for the construction of large sheds on the vacant ground across the track, for use in shipping slate. The industry has grown to such proportions as to necessitate special arrangements for the speedy handling of slate cargoes.

PELTON WHEELS.—Several large Pelton wheels have been sent down to the McNulty mine recently, and to-day D. C. Wickham goes down to put them in place and reconstruct the workings at the mine.

Lake.

PROSPECTS.—*Avalanche*, Feb. 1: As yet Lake county has no mines except those for quicksilver, but from the prospecting which has been done and is being done we are led to believe that ere another year passes, Lake county will have some veritable silver and gold mines. Judge Hudson and some others have discovered a ledge west of town, somewhere in the vicinity of the Watenberger place, that pans out from the cropping \$2 to \$3 of precious metal per ton, and this from croppings indicates that when the ledge is traced into solid walls and becomes more compact, it will produce paying ore. They have organized a Co. and intend to work and prove their prospect as soon as circumstances will admit. On the other side of the lake, Lil Boggs et al have been doing some work between showers, and they also have first-class indications. They have had some ore worked which paid from \$3 to \$6 per ton, and this too from near the surface. There is not much doubt but this prospect will lead to paying ore.

Nevada.

NORTH STAR MINE.—*Grass Valley Union*, Jan. 30: Underground work has been resumed at the North Star mine, and the pumps and mill are being run by water-power. Several of the lower levels of the mine have filled with water, and extra pumps are to be put in to relieve them.

NORTH STAR.—*Grass Valley Tidings*: A report of the North Star Co.'s operations will be ready for publication shortly. Two dividends, each of \$50,000, were paid in 1889. Development work is going on steadily. The 1900-foot level is being extended, and sinking for the 2000-foot level has been commenced. The superintendent's latest reports show that 35 stamps of the company's mill are crushing quartz and five are on "stope waste." It seems that the stopes in the upper levels are gone over, and the rock which in years past was thrown back as waste is now being taken out and milled at a profit. Mr. Hague says that this waste will yield on an average from \$3 to \$4 per ton, and it costs about \$1.50 per ton to raise and mill it.

EMPIRE MINE.—*Grass Valley Union*, Feb. 1: The Empire mine is now receiving 150 inches of water from the South Yuba reservoir which enables the water in the mine to be handled by water-power. The Empire, like all the other mines, is receiving much sewage water, and in addition to running the pumps it has been found necessary to resort to bailing to prevent the water filling the lower levels. This is being done successfully now, and when more water is received, which is expected in a few days with the continuance of the present mild weather, there will be no difficulty in handling the water. No underground work is yet being done in the mine.

NORTH STAR.—The three lower levels of the North Star mine have been filled with water, on account of the seepage, and no work can be done below the 17th level for the present. An extra 10 and 8-inch pump is to be put in to get rid of surplus water. The mine is now receiving the hence fit of 350 inches of water from the Greenhorn ditch for water-power and has no further occasion to use steam.

Placer.

JAKE NEFF'S BONANZA.—*Herald*: About two years ago Jacob Neff and ex-Governor Perkins purchased the Church mine at El Dorado, county of the same name, and not long ago equipped it with a complete and adequate hoisting plant, subsequently giving the shaft depth. Lately, at the 500-foot level, a 22-foot ledge was tapped. It is stated that the rock is rich, and that from the outlook the property promises to be a bonanza.

THE NEVERSWEAT MINE is one of the group of Ophir mines, and situated on Duncan Hill. There has never been much said about this mine, as the owner prefers to go along his own way, and does not court notoriety. The ledge is well developed, and of sufficient width to be easily and profitably worked. The rock shows gold, and from tests that have been made, there is no doubt of its richness. The shaft is now down several feet, and the owner feels justified in sinking deeper as soon as the water will permit.

EMPIRE.—F. C. Halstead of Yankee Jims will start up the Empire mine, near Duncan Hill, about the 15th of this month.

CALIFORNIA IRON AND STEEL CO.—*Grass Valley Union*, Feb. 5: The California Iron and Steel Co., whose furnace is at Hotelling, Placer county, has been involved in litigation for several years, but

negotiations have recently been entered upon which it is thought will end in a satisfactory settlement. The company as a corporation is impecunious, although owning much property in Placer and Nevada counties, but its principal stockholders, George W. Gibbs, Egbert Judson and A. P. Hotelling, are wealthy men, and against them individually has a suit been pending to meet certain liabilities of the company. They have signified a willingness to make terms, and hence legal proceedings against them have been suspended.

San Bernardino.

MINERAL PROSPECTS.—*San Bernardino Times-Index*, Feb. 1: On Saturday evening last our reporter called upon J. H. Crossman, a member of the State Mineralogist's corps, who was sent to this county to examine and report upon its mineral deposits. The reporter asked the gentleman what he thought of the mineral resources of the county from the examinations that he had made during the past two months. "I am more than pleased with the country as I have found it, and I have seen some of the largest ore bodies that I believe exist in the world. In the Morongo district at the Black Hawk mines there are immense bodies of rich gold ore, and an English company is now preparing to erect a 20-stamp mill. The Oro Grande mountains contain immense deposits of rebellious ores, but at present they are not worth taking out, as the cost of fuel is too great, but when the Utah Southern comes through (and I know for a fact that it will) smelters will undoubtedly be built at Oro Grande or San Bernardino on a large scale, and then all of this ore will be worked, and millions of dollars taken out. The galena of these mountains can all be profitably used when smelters are erected. In the Ord district there are immense bodies of copper and gold-bearing veins extending through the entire mountain, and these mines, as above stated, only await the arrival of cheap fuel before being worked. San Bernardino county and a portion of Inyo, which I have visited on this trip, is the greatest mineral country that I have ever examined, and I believe that it is the greatest mineral-producing country in the world. These desert regions cannot be traversed in the summer and work must be done in the winter and spring months. All that is required to make this one of the richest and most populous regions in the United States, whose supplies will be drawn from commercial and mining centers and more favored agricultural regions, is a railroad, and this much-needed want will soon be at your doors. The Mojave desert contains large deposits of gold, silver, borax, soda, copper, salt and other minerals, and when silver reaches 100 cents, this section will become very populous. Utah has the fuel that we want, and when the iron horse comes across that desert with coal that can be laid down here for \$5 per ton, a million dollars worth of smelting works will be erected in your city, and thousands of dollars will be put into circulation daily, for then the miner with a small grub stake can go to work on his mine, take out a few tons of ore, sell it to the smelter for cash for its assay value, and go back to his work and develop his mine, the ore in the same paying all expenses. The magnetic iron deposit in the Ord district is an immense one, and so powerful is it that it ruined my watch while passing over it. When your fuel problem is solved, Resting Springs will contain a population of 150,000 operatives."

San Diego.

BANNER.—*Julian Sentinel*, Feb. 1: The Bell and Walker mine is showing up fine and the boys are happy. Within the last two months only four millists have been located in Banner, and more in view. Lane and Smith of the Cincinnati Belle mine are expected back to resume operations.

Sierra.

DAMAGE AT PIKE CITY.—*Transcript*, Feb. 2: It is reported that the snow falling in the late storm did much damage at Pike City. The hoisting works of the Alaska mine were broken—how badly is not stated—and 2000 feet of the tramway shed went down. Several buildings in the neighborhood were broken.

WORK STOPPED.—*Mountain Messenger*, Jan. 25: Work in all the mining claims in this section has been suspended by the storm.

YUBA CO.—*Grass Valley Union*, Feb. 1: P. Campbell was up from Smartsville yesterday. He said drift-mining had not been interfered with by the storms, and that the snow did not reach Smartsville. Smartsville is situated in the semitropics, where the best of oranges are raised.

NEVADA.

Washoe District.

OPHIR.—By Telegraph, Feb. 3: On the 1300-foot level from the end of the east crosscut from the shaft station a south drift is advanced 313 feet from the end of the east crosscut, 316 feet from the shaft station. Its face is in porphyry, mixed with quartz, showing value. No work was done last week.

CON. CAL. AND VIRGINIA.—On the 1650-foot level repairs are in progress to the raise above the end of the east crosscut from the end of the north drift from the winze sunk 60 feet below the end of the south drift. The snow blockade on the Virginia & Truckee Railroad has caused a necessary reduction in the force of miners, as it was impossible to ship ore to the mills or bring wood to the mine. We have on hand in the assay office bullion valued at \$14,476, and enough more at the Morgan mill to make an aggregate of about \$32,000.

CROWN POINT.—Ore shipments will be resumed next week.

BELCHER.—The 850-foot level east crosscut continues in porphyry. **SEGREGATED BELCHER.**—Ore bunches are still showing in the 1200-foot level drift from the winze. The 1000-foot level east crosscut is in low-grade quartz.

SILVER HILL.—The usual progress has been made in the 160 and 260-foot level explorations. **JUSTICE.**—The mill is crushing the usual amount and quality of ore.

ALTA.—The mill is again in full operation, crushing the usual amount of ore. **SAVAGE.**—A large area of ore is stripped ready for extraction, and exploratory work is in progress as usual.

HALE & NORCROSS.—The usual exploratory work is in progress, and ore extraction will be resumed as soon as it can be got to the Nevada mill.

CHOLLAR.—The Nevada mill stamps are temporarily hung up, but the usual exploratory force is

employed in the explorations above the 350-foot level.

Floche District.

THE RAYMOND DEEP WINZE.—*Pioche Record*, Jan. 28: On Sunday last the large pump, for ten years under water at the 14th level, was uncovered, and found to be in almost perfect condition. The valves had been set wrong and that no doubt was the immediate cause of the failure of this pump to drain the winze when formerly working. When the pump had been cleaned and the valves set as they were made for work, the compressed air was turned on, and pumping commenced with such force that the old pipes leading from the 14th to the 13th level could not carry the volume of water sent up, and burst under the pressure. This defect has been remedied, and yesterday morning the water had been lowered to a point 15 feet below the 14th level.

Tuscarora District.

NAVAJO.—By Telegraph, Feb. 1: The upraise from the south drift on the 150-foot level is extended 8 feet. No. 2 crosscut from the south drift on the 350-foot level is extended 24 feet.

NEVADA QUEEN.—The north gangway from the 600-foot station of the North Belle Isle shaft has been extended 23 feet. The face of the drift is in a softer formation.

BELLE ISLE.—The crosscut from the north gangway, near the south line on the 250-foot level, is extended 21 feet. The west crosscut from the north gangway, 350-foot level, has been extended 12 feet. The rock is extremely hard.

NORTH COMMONWEALTH.—On the first level the north drift from No. 1 east crosscut has been extended 16 feet. The face continues to show high-grade ore. On the second level the joint crosscut is extended 17 feet, and has cut into the vein, face being in low-grade ore, assaying from \$33 to \$108 per ton.

NORTH BELLE ISLE.—The south drift from station C crosscut on the 300-foot level is advanced 19 feet. The south intermediate drift from No. 3 chute above the 300-foot level is extended 7 feet. The ore continues in size and quality about the same. The north gangway on the 600-foot level is extended 23 feet. The rock in the face is softer.

GRAND PRIZE.—The 400-foot level west drift from the north crosscut is extended 10 feet. The north crosscut is extended 7 feet. The drift from the bottom of the winze in the south drift is extended 14 feet. The 500-foot level north crosscut is extended 26 feet, and has cut north lateral vein No. 2, showing stringers of good ore. The face of the west drift from the north crosscut is advanced 21 feet without change.

DEL MONTE.—On the first level the north drift from No. 1 east crosscut is extended 13 feet, exposing fine ore. On the second level the joint east crosscut has been extended 17 feet, the face being all in low-grade ore. We will have to go about 25 feet to reach the ore body opened by the first level. On the third level No. 1 north drift from the east crosscut has been extended 12 feet, and continues to look well.

COMMONWEALTH.—On the first level the east drift from No. 1 north drift is extended 10 feet; the ore continues to show well as the drift is advanced. The west drift from the same point is advanced 5 feet, and chutes are being put in preparatory to stopping. No. 3 upraise from the Dolan drift has been extended upward 9 feet, developing fine ore. The north drift from No. 5 chute has been advanced 11 feet; it has about 30 feet yet to go to the North Commonwealth line. There is very high-grade ore being opened up by this drift. On the third level stopes are being opened and are looking well. Very little work is being done on this except to open the stopes ready to extract ore. On the fourth level the north gangway has been advanced 11 feet. We have had to timber 75 feet, which has retarded the work somewhat. The stopes in the different parts of the mine are looking as well as at any time heretofore. They have yielded 125 cars of ore per day, which has been sent to the mill and concentrating plant. The average pulp assay for the week was \$251.83 per ton. Bullion shipped to the secretary was valued at \$37,898.93. Crude bullion is on hand worth about \$12,000. The concentrator crushed 525 tons, the assay value being \$17.04 per ton. The average concentrate assay was \$247 per ton. The mill is running nicely and doing good work.

ARIZONA.

SHIPPING ORE.—*Prescott Courier*, Jan. 28: Frank Kuhne has a big force of men taking shipping ore from the Belle mine, Walker district. Joe Chambers makes an occasional run with the mill in said district. Snow has been too deep for constant running. N. L. Griffin and other owners of mines keep taking out ore. Paul Johns, one of the lessees of the Cococin mine, arrived in town Saturday. His partners are taking out ore. Jas. O'Hara, just from Martinez district, says the Congress 20-stamp mill is pounding out plenty of gold. The mine is yielding well. Owners of other mines in the district are developing them. The superintendent of the Black Horse mine is having new machinery put in place and will give the mine a thorough prospecting. The company that owns the mine is very wealthy. Quartz Mountain mill is crushing good ore. The gold is shipped to Kansas City. The Hillside mine is not shipping ore just now. Road's too muddy. Owners and lessees expect to ship \$500,000 worth of ore next spring and summer. Placer miners of Weaver, Hassayampa, Walker, Big Bug and Black Canyon district, have, during the past month, shipped \$20,000 worth to Prescott and other places. Miners of this section are hoping that Mr. Williams, manager for Mr. Dodge and his partners, will, in the spring, put up and run regular reduction works, and save to this section the money that is now paid to foreign smelters for working our richest ores.

DISTRICTS AROUND PRESCOTT.—*Courier*, Feb. 1: Mr. Giroux, Supt. for W. A. Clark, is preparing for a vigorous spring and summer's campaign in United Verde. His smelters are in first-rate condition; mines filled with rich ore. The district has a great many veins which carry gold, silver and copper; is about 25 miles northwest of Prescott. Wood, water and grass are abundant. Cherry Creek district is near by. Its principal mines are the Etta and Mocking Bird. Both have mills and have paid well in gold. Ore is coming out of the Mocking Bird. The Etta mill is being put in good order. Owners of the Wire Gold mill and mine, near Squaw

Peak, are preparing to start their mill. Miners of Ash Creek district are not making much of a stir. They have good mines and should work them. All is quiet in Agua Fria district, but its neighbor, Big Bug, is moving along in fine style under the able management of Mr. J. J. Williams, who understands every twist and turn of mining and whose management cannot be improved on. The district has a great many mines of gold, silver and copper; has wood, water, grass and a fine working climate. It has, also, a great deal of gold in gravel claims. Further south and east is Black Canyon district, in which there are such good mines as the Beaver, Mesa, Iconoclast and Valencianna. There is not a mill in this district. Miners work their ores by arrastra process, or ship it away. Still further south is Tip Top, famous for its rich silver ores, some of which have paid thousands of dollars to the ton. Castle Creek district adjoins Tip Top on the west. It has a mill and several good mines. Coming north toward Prescott, Bradshaw district, with its four mills and ever so many mines; the Peck, Turkey Creek, Hassayampa, Groom, Walker and Slate Creek districts, are passed through. Active mining and milling are being conducted in all of them. Still west are the districts of Walnut Grove, Weaver, Martinez, Eureka, Harqua-Hala and others, whose quartz and placer mines have paid, are yet paying and will continue to pay for hundreds of years to come. These districts, with Silver Mountain, cover a country 80 by 100 miles long by about 60 wide, in the heart of Arizona. There are other mineral regions to the north, the south, the east and the west of it, but none so large. So Yavapai county may be said to lead all of her sisters in the number of her mines, as well as in timber, grazing, etc. The other great mineral counties are Graham, Gila, Cochise, Pima, Pinal, Maricopa, Yuma and Mohave. Apache county has not, as yet, been prospected to any great extent, but it is known that she is rich in coal. To work our mines successfully, and so develop other interests, we must have more people and capital, more railroad facilities, general quartz reduction works at proper places. These, with reservoirs for the storage of water, would soon make of this struggling Territory a great State.

STOCKTON HILL.—Mohave *Miner*, Feb. 1: Jas. Orr is down from Stockton Hill with a carload of high-grade ore from the Black and Tan mine, which is being treated by the Kingman Sampling Company. John K. Mackenzie has a bond on the Cincinnati mine owned by W. H. Hardy and has a force of men at work developing it. A good many thousands dollars have been taken from the working of the Cincinnati, and it will yield many more. C. H. Park has purchased the interest of A. J. Coon in the Sabbath Bell mine at Mineral Park, paying \$2000 therefor. There is now considerable good ore in sight in the mine, and it seems probable that it will be as good as any claim in that place.

IMPORTANT MINING SALE.—Wilcox *Southwestern Stockman*, Jan. 30: The sale of a valuable group of lead and silver mines located in Aravaipa canyon, and owned by John P. Harr, Charles White, the Dunlap Bros., W. C. Bridwell, Charles McGary, Tom Horn, Charles Cunningham and George Zeigler, was closed early this week, and a large per cent of the purchase-money was paid the above-named gentlemen on Monday. The total amount to be paid is about \$40,000. The purchasers, Messrs. J. W. Goddard of New York, and John Heard, Jr., of Boston, left for their homes on Monday night, but will return here in the course of a few weeks. They will organize and incorporate a company, to be known as "The Aravaipa Min. Co.," under the laws of the State of New York. Dr. Alex. Trippe of Globe, one of the most thorough and experienced mining men in the West, is to be general manager of the new company, which is a guarantee that operations will be conducted in a practical manner. Before active operations can be commenced on the mines, several roads will have to be built, and this work will first claim the doctor's attention. A large smelter is to be constructed near the mines, work on which will begin in a few months. Mr. Goddard, one of the purchasers of the mines, is a gentleman of great wealth. Wilcox will be greatly benefited by the opening up of these mines.

RICHMOND BASIN.—Arizona *Silver Belt*, Jan. 28: Wm. Gill, who was in the Globe from Richmond Basin yesterday, reports that chloridizers at that camp are all getting some ore. Joe Henry, Wm. Gill, Paul Johnson and Ben Hardin have a lease on the Mack Morris, and are sanguine of striking good ore. Lou Scanland, Bud Woodson and Ikenberry are sorting ore from the Helen mine, preparatory to shipment. Moyle and Viette are engaged in the same work, the ore coming from the Harrison & Morton claim, which is a good one. Joe Brewster and Clarence West are winning wealth from the North Star.

COLORADO.

BIG SIX.—Leadville *Herald-Democrat*, Feb. 1: The Big Six M. Co. evidently means business, as they have started in for work, the snow being cleared away from the immediate vicinity of the Big Six shaft, preparatory to the building of a large and commodious shaft and engine-house, while negotiations are now pending for the purchase of a large plant of machinery to go on that shaft. This starting up of the reorganized company means a great deal for that part of our camp, as without doubt all that section of country lying to the eastward of the Breece fault, up to the Highland Chief and Little Johnnie, is undoubtedly underlaid with mineral and only requires a little prospecting to develop it. At the time the old organization was working these claims, the ore from that section was not considered of very great value, but during the past three years such a change has come over the spirit of our dreams—of ore—and such an enhancement of the properties has occurred through the increased value of silver produced here, that they may now be worked, even on what ore was showing at the time of the closing down, to a profit. That the Big Six M. Co. will make a success of the undertaking would appear certain, though in our opinion the shaft selected for the commencement of operations is not the best one to begin on. The fact that nearly all of the ore found in these claims carries a very fair percentage of gold must not be lost sight of either, and that feature of the mining on that side of Breece Hill will eventually prove to be a very important

one, the gold assays alone, as we remember them, going as high as 18 ounces per ton, while the average breast samples, by control assays, would run an ounce of gold to the ton, and carry from 35 to 230 ounces in silver. There is now standing in the Netie Morgan a body of iron ore that will carry enough silver, together with the large percentage of iron in excess of silica, to make it pay a reasonable profit, and we are glad to see this district being taken hold of by energetic men who intend pushing the development. Our camp only requires a few more such practical undertakings to cause 1890 to be a year long to be remembered in the annals of Leadville prosperity. The Woodford Brothers, on the Champion, are said to be doing exceedingly well, some reports placing their output at such a point as to net the fortunate lessees some \$20,000 per month. They are undoubtedly doing very well, and probably are in no hurry to throw up the lease. The concentrating-mill at Recen is soon to be started up, after being placed in thorough repair, and is said to be doing this work in order to handle overflow from the White Quail, Aftermath and Delphos. Messrs. Ross & Co. are starting it up.

DAKOTA.

TO CONCENTRATE PYRITES.—Deadwood *Pioneer*, Jan. 28: Within hearing of a *Pioneer* reporter was dropped the remark a few days since, that an enterprise was projected which will prove of importance to Deadwood. It was further stated that capital to carry through the project was subscribed, and that some of the contracts had already been let. After not a little difficulty a clue was discovered, which being assiduously followed enables announcement that the projected enterprise is one to concentrate the Black Hills pyrites, treat them by a chlorination process and thereby add many millions of dollars to our annual yield of gold.

IRON ORE.—A force of from four to six men is now employed developing a ledge of iron ore on Elk creek. Average assays of the ore show it carries about 46 per cent metallic iron. The property is owned by Messrs. Blackstone and Grier of Lead City.

SYNDICATE SMELTER.—Fireclay and firebrick ordered from Rapid have not yet been received, so the little plant remains cold and lifeless. As several hundred dollars' worth of ore-fuel and coke yet remain on hand, Supt. Carpenter has concluded to start it up again as the cheapest way to get the money out of the supplies yet on hand. The *Pioneer* is informed that ore, etc., sufficient for a three days' run was upon hand at the time of the accident.

IRON HILL.—Elsewhere appears call for proposals to furnish lumber for rebuilding the Iron Hill hoisting works. The company proposes to lose no time in completing the plant, and will have it running and hoisting ore again most probably before the first day of March.

LOWER CALIFORNIA.

ALAMO.—Lower *Californian*, Jan. 28: It has been snowing nearly every night at Alamo lately, and in place of the mud which the people have been enjoying for some time there is now slush, and plenty of it. The weather is mighty cold, too, up there at Alamo, and the unlucky fellows who have not where to lay their heads are daily reminded that even in this Italy of America there are times when Nature is not all sunshine and singing birds. But a spell of cold and disagreeable weather cannot knock out the old miners, for the most of them are used to camps where there is more snow and ice than at Alamo, and they are staying with it. Don Pedro Miramontes has received a piece of rock from his ledge of decomposed quartz, located between the Remember and the Nuestra Señora de Guadalupe mines at Alamo. The specimen is one of the prettiest ever brought in from the camp, and sparkles with gold. This ledge has been worked for a month past by Juan Drew and old man Murietta with gold-pans, and they have averaged \$30 per day between them. The El Paso, the Lucas and the Lane mines are running and doing good work. Robert Frey and Cad. Preble were in town this week from Camp Nacional, where they have been sluicing, making \$30 a day between them for a few weeks. They had to abandon the work when the ground froze.

IDAHO.

LITTLE QUEEN'S RIVER.—Elmore *Bulletin*, Jan. 25: Speaking of this mining section and its possibilities recently with a gentleman from Atlanta, we learned of a mining district that has for years been under a cloud, but which in the near future bids fair to be a veritable El Dorado. The mines in question are on Little Queen's river, about 10 miles northwest from Atlanta, and are in a section well supplied with timber and water. There are at present: First—the Alvina lode, easily traced upon the surface a distance of 700 feet, showing a width of from 7 to 10 feet, the croppings at any place giving assay returns of from \$5 to \$30 per ton, and in a tunnel 235 feet to where it taps the lode and about 150 feet from the surface, the quartz returns \$45. Next in size is the Craigmoor lode, which is very uniform in width, being on an average about six feet. On this property there has been something like 700 feet of tunneling done, the ore giving assays of \$7, \$9, \$50, \$6, \$37, and in one place a pay streak from three to four inches wide on the footwall going \$280. On the opposite side of the hill is the Craig location. The assays from the Craig, however, do not go higher than from \$28.50 to \$30. The Wayward has a tunnel run 300 feet to the face, from which there is a raise 60 feet. This lode is about 4½ feet in width from wall to wall, and runs \$35 to the ton. South of these mines is the Letitia, having a tunnel driven near 150 feet from which there has been very rich ore, extracted going as high as \$400 per ton. Immediately south of the Letitia is the Finis lode claim. There are seven tunnels driven into the hill, and in six of them there are well-defined quartz ledges carrying pay ore from \$10.50 to \$700 per ton, chiefly in gold, and free milling mostly, although there is some of this quartz that yields very rich sulphurets. The last-named mine is the only one that has milled ore to any extent. It being mostly free-milling rock, there was a chance to make money out of it even in the early days when these properties were worked. The plant erected for the reduction of this gold ore was an early-day Huntington two-stamp rocker-mill, copper-plate process, capable of crushing not more than two tons per day. There

was not to exceed 100 tons of ore worked, and rock that did not go \$50 or more was never taken out. These mines have not been worked for the past 10 or 12 years, and until recently were owned by different parties located all over the country, but now the entire property is owned by Mr. C. W. Joy of Atlanta, Idaho.

MONTANA.

COPPER-PRODUCERS.—Inter-Mountain, Jan. 25: Little can be said of the mining industry for the week last past other than to note the improvements as they progress and the fluctuations of the copper market that regulates the opening up and shutting down of some of the prominent producers of this district. Almost all of the large copper-producers are doing all the work possible in extracting ore sufficient for the smelters, the latter not being half sufficient to answer the production of the mines, and some talk is going the rounds that improvements will be added to some of the already large smelters the coming summer so as to answer to the demands made upon them.

SMELTERS ALL BUSY.—The smelters are all working at their full capacity and making their regular shipments of copper matte and a vast amount of ore is being shipped out of the State for reduction in other parts. The new Silver Bow smelter is completed and is turning out its regular amounts. This company at first did not produce as pure matte as some of the other smelters, but the furnaces have been remedied and are now turning out the article as high or higher in grade than any smelter in the camp.

BUTTE AND BOSTON.—The mines of the Butte & Boston Co. are coming to the front, the rich strike continuing in the West Gray Rock, and if anything it increases in richness as the drifts progress. Sinking also continues in the East Gray Rock, though no ores are produced from this mine. The Silver Bow mine has encountered a much better quality of ore of late in the drifts on the 400 that tends to greatly enhance the value of the property. The mine is systematically worked and placed in a condition to work it on an extensive scale the coming summer. Much water has to be contended with and the drifts are as wet as any in the camp, one of the best indications of ore.

CHAMBER'S SYNDICATE.—At the Chamber's Syndicate of mines, the substitute for the Anaconda and St. Lawrence, they are meeting the demand made by the smelter at Anaconda. Their shipments run between 65 and 70 cars of 20 tons in each car every 24 hours, and at times the supply is such that the mines have to suspend for a day for the trains to pull the chutes down. All sinking has been stopped and only stopping is being conducted with a force of miners equal in number to any ever employed in the camp before. However, the output as yet does not equal that of the larger mines now suspended on account of the fire.

THE ST. LAWRENCE FIRE.—There is nothing of importance to note concerning the fire in the St. Lawrence, but that the water from most of the syndicate mines added to that of the Moulton Water Co. is still being used in endeavoring to extinguish the flames, but with what result cannot be determined. Water must by this time have reached the 800 of the Anaconda, though it would take an age to flood it, owing to the very dry condition of the mines in the upper workings. Nothing further is heard as to the intention of the company to sink a new shaft, but there is no doubt that (unless upon investigation the fire is found to be not nearly as extensive as surmised) they will have to sink a new one before the property can again be worked. No smoke or gases are discernible about the works.

THE MOUNTAIN VIEW OF THE BOSTON & MONTANA CO. is still cutting a station on the 900, and no crosscuts will be run at either the 900 or 1000 to tap the lead until the pumps are in perfect readiness to handle the water that is bound to be encountered. Pumps sufficient are in the mine and a thorough and competent foreman, Richard Dawe, stands ready to cope with any emergency that may arise. The Big and Little Colusas are plodding along as in the past, with ore in reserve to last for a generation. The great drawback of this corporation is the lack of smelting capacity, which the company will increase by the works at Great Falls.

COPPER PROPERTIES.—Most of the copper properties of lesser magnitude that laid idle for some time, owing to the low stage of the copper market, are again to the front. The sight at the Ramsdell, Shakespeare and Bricker Parrots resembles those good old days long since past, and puts one in mind of future prosperity. It seems pleasant to see the long line of miners of evenings coming home and going to work, where not long since quiet reigned supreme.

THE PARROT.—The Parrot mine is working steadier the present month than for many months past, producing about 250 tons of ore every 24 hours. The hoist has received a coat of whitewash and presents an elegant and brand new appearance.

THE LEXINGTON. where the most attraction is centered, owing to its great depth, is within two sets of what is called the 1500 level, which is really 1400 feet below the surface, the deepest in the camp. It will yet be some time before the company can determine the value of development, and it may be that the company may prospect the ground by the diamond drills and crosscut afterward. The company has diamond drills on hand and such very likely will be the mode of procedure. Ore for milling is taken all the way from the 600 to the 200, though considerable custom ore is being put through the company's mill.

THE WEEK'S BULLION.—Following were the shipments of bullion made from the camp this week: Moulton, \$22,481; Lexington, \$16,208; Lexington, \$35,441; Butte & Boston, \$21,152; Alice, \$47,200; Lexington, \$6760; total, \$66,032.

WEST OF THE GULCH.—The old Anselmo, which has so long lain idle, is to again assume its place among the ore producers of the camp, a lease having been given to Herman Hauswirth and his brother Robert. This mine has been dormant for a long time, while all the mines surrounding have been running steadily, producing their thousands.

At Lyon City. M. T., two miners were killed by a snowslide this week, and a great amount of property was destroyed.

The Mining Companies' Financial Standing.

The following is the financial standing on the first Monday of the present month of the mining companies listed on the two exchanges in this city:

	Cash.	Debt.
Alta.....	\$ 40,447	.....
Alpha.....	6,371	.....
Andes.....	11,971	.....
Bodie Con.....	10,040	.....
Benton Con.....	90,000	.....
Belcher.....	18,857	.....
Belle Isle.....	.....	6,267
Best & Belcher.....	.....	5,394
Bulwer.....	13,843	.....
Bullion.....	24,418	.....
Challenger Con.....	.....	1,680
Caledonia.....	7,850	.....
Chollar.....	\$28,652	.....
Con. Cal. & Virginia.....	39,138	.....
Confidence.....	.....	5,015
Con. Imperial.....	11,133	.....
Con. New York.....	9,894	.....
Commonwealth.....	.....	\$1,075
Crocker.....	.....	11,773
Crown Point.....	.....	\$3,420
Del Monte.....	.....	8,383
East Sierra Nevada.....	6,475	.....
Eschweiler.....	16,330	.....
Gould & Curry.....	10,308	.....
Grand Prize.....	.....	\$0,678
Hale & Norcross.....	.....	\$4,206
Holmes.....	.....	9,230
Independence.....	.....	.....
Julia.....	8,216	.....
Justice.....	\$9,011	.....
Kentuck.....	4,892	.....
Lady Washington.....	10,355	.....
Locomotive.....	1,144	.....
North Belle Isle.....	.....	\$3,010
North Commonwealth.....	.....	16,933
Mexican.....	12,954	.....
Mono.....	18,571	.....
Nevada.....	.....	.....
Nevada Queen.....	.....	8,849
Occidental.....	.....	\$25,014
Ophir.....	3,603	.....
Overman.....	27,260	.....
Peer.....	6,623	.....
Peelers.....	6,335	.....
Potosi.....	.....	1,319
Savage.....	18,610	.....
Scorpion.....	7,078	.....
Seg. Belcher & Mides.....	.....	18,293
Silver Hill.....	11,680	.....
Sierra Nevada.....	26,504	.....
Silver King.....	.....	10,009
Standard.....	.....	\$11,650
St. Louis.....	301	.....
Syndicate.....	7,812	.....
Union Con.....	4,949	.....
Utah.....	8,539	.....
Weldon.....	3,259	.....

*Unsold bullion \$44,893 and further shipments to hear from.

†With more assessments to be collected.

‡Offset reported of \$95,000 in bullion and further shipments to be heard from. Mine expenses to come out.

§January bullion returns not received, also mine expenses.

||Including the company's note for \$20,000 given in payment for mill.

Owing to snow blockades, many of the mines, expenses in last month not included.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, department 10, San Francisco:

BELVIDERE M. Co., Feb. 1. Location, Sierra Co. Capital stock, \$100,000. Directors—Charles E. Cahn, Edward Lande, Bert Schlesinger, John Cain and Edward J. Jackson.

CENTRAL AMERICAN DEVELOPMENT Co., Feb. 4. Object, to deal in real and personal property. Capital stock, \$1,000,000. Directors—W. L. Merry, W. B. Ewer, Richard Hoskin, Geo. W. Ostom, Thos. W. Jackson, Frederick Holmes and W. C. Quinby.

MASCOT M. Co., Feb. 5. Location, Nevada. Capital stock, \$1,000,000. Directors—Wm. Gauge, David Hunter, Herbert Spencer, H. W. Waller, and L. C. Fraser.

J. A. FOLGER Co., Feb. 5. Object, to carry on the grocery business of the late James A. Folger. Directors—Elizabeth B. Folger, Charles J. Paddock, Henry Wadsworth, Robert R. Vail and John H. Titcomb. Capital stock, \$400,000.

RIVER, HARBOR AND CANAL DREDGING Co., Feb. 5. (Incorporated under the laws of Colorado.) Capital stock, \$1,000,000. Directors—W. L. Merry, W. W. Montague, A. Boschke, W. H. H. Hart and F. Burrell.

Meetings and Elections.

Annual meetings and elections have been held by the following mining companies:

CALIFORNIA POWDER WORKS, Feb. 3: President, G. T. Lawton; superintendent, B. Peyton; secretary, John F. Lohse; Directors—G. T. Lawton, J. B. Haggin, John Birmingham, M. A. de Laveaga, B. Peyton.

PACIFIC ROLLING MILL Co., Feb. 5: Directors—William Alvord, N. Luning, James G. Fair, Edward Coleman and L. C. Bresse. Subsequently the following officers were elected: Wm. Alvord, president; L. B. Benchley, general manager; Patrick Noble, superintendent, and C. M. Keeney, secretary and treasurer.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Commonwealth, Feb. 2, \$15,000; Cons. Cal. and Virginia, \$80,000; Young America South, \$5015; Hanauer, Jan. 28, \$4200; Germania, 29, \$6192; Hanauer, 29, \$3175; Germania, 30, \$5439; Commonwealth, 6, \$19,000. Total for January, \$117,000.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall not be held responsible for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

MECHANICAL PROGRESS.

Is the Blacksmith in Danger?

Several articles have recently appeared in our technical exchanges which seem to imply that the ancient and time-honored trade of the blacksmith is in danger of coming to an end through improvements in machinery. A correspondent of the *Blacksmith and Wheelwright* takes up the cudgel for the trade, which that journal specially represents, in the following somewhat vigorous manner:

Undoubtedly machinery has damaged some trades and entirely destroyed others, but just as long as wrought iron is used, the blacksmith's trade, though it may be modified, will not be destroyed. And further, until a metal as good and as abundant, and as cheap can be found, and one that can be welded—mark the word welded, for the weld makes all the difference between the smith and the tinker—there is no fear but what good blacksmiths will be in demand. A recent correspondent of your journal says: "Once he—the smith—needed skill to make horseshoes, horse-nails, and sometimes part of his simpler tools. His spare hours need to be occupied in producing a supply of these requisites of his trade. Now they are manufactured by machinery, etc." All that is true and more too; the blacksmith once made all his own tools, and also made the tools for every other trade, but not in my day. If the smith is a good workman he makes and repairs many of his own tools yet, and makes better ones than he can buy. In the large cities they are still generally making horseshoes by hand, for the reason that machine-made shoes are too soft and soon wear out on paved and macadam roads.

Let me tell the author of the above, a good blacksmith needs all the skill he ever did, just as much now, in fact, I think more. Sixty years ago there was no farm machinery either manufactured or to be repaired. The thrashers, the corn-shellers, both steam and horsepower, the reaper and mower, the sulky and gang-plow, the seed-sower, both for corn and small grain, to say nothing of the various kinds of harrows, the horse corn-cultivator, the horse hay-rake, and many other of the farmers' machines have all come into use within the last half century, and all of them are American inventions.

Fifty years ago the blacksmith had very little work during harvest-time, and many of them left the shop to mow grass or grade small grain. Now for six weeks before and during harvest he is kept busy repairing farm implements. Yes, and it requires no little skill to successfully repair such work. Then again, in the Eastern States, at least, in those days there was no such thing as a steel plow, all cast iron; now they are nearly all steel. Does that look as if the blacksmith was in much danger? But some one may say he will be seriously damaged by the nailless horseshoe. Not much. Read what they say: "It is requisite that a horseshoe that can be applied without the skilled labor of the farrier, should be easily adjustable, should require the use of no special tools, should be anatomically suited to the form of the foot, should entail no inconvenience to the horse in his daily work, and should not be liable to set up new dangers and difficulties as had, perhaps, as those it was designed to cure." Now does not that read just exactly like what is said about patent medicines? And still further, describing the nailless shoe, it says: "The manufacturers claim for it that it causes no pain to the animal either in putting on or taking off the shoe, assists instead of preventing the free and easy action of the animal, obviates sand cracks, thrashing or cutting, is not heavier than the ordinary shoe, is more durable, and last, but certainly not the least in its favor, is, that a stable boy can quickly adjust it. The shoe is adapted for all purposes, and of all kinds."

What do you think of that, horseshoers? One paragraph begins, the other ends up, by putting you down on a level with the stable boys! So any man or boy can easily fit horseshoes, can they?

HARDENING AND TEMPERING STEEL.—It has been remarked that, in the whole range of the mechanical arts, it is scarcely possible to find another process at once so simple and so common in principle, and yet so little understood in theory, as the hardening and tempering of steel. This is illustrated, for instance, in the hardening and tempering of the cold chisel, usually done at one operation. Thus, after heating the point, it is dipped in cold water, the tool in this way becoming hardened, and after cooling, the operator lifts the steel from the water and watches it closely as the heat remaining in the body of the metal diffuses itself through the hardened portion. As the heat spreads, the color passes from a white luster to a pale yellow, to a straw color, to a brownish orange, the point being now dropped into water again, that after cooling the temper may be that desired. If delay had attended the operation, the brown would be dappled with purple, then passing successively into full purple, light blue, full blue, dark blue, each color giving its own temper upon cooling, as bright blue for swords and watch-springs, dark blue for saws, etc. The philosophy of this has baffled scientific research, although upon the correct solution of the problem depends that bleeding of maximum hardness and

toughness which is such a desideratum. Now either is procurable at pleasure, as the colder the bath the harder the steel, and the slower, as in oil, the tougher; but extreme hardness is produced at the cost of tenacity, and vice versa.

Disposing of Old Rails.

There are two ways of cheaply economizing old rails. One method is that recently introduced by Edwin C. Wassel of Pittsburgh. This method consists of a process whereby old rails can be readily converted into a soft merchantable bar steel, suitable for horseshoes and kindred purposes. The old rails are first treated in the furnaces and then rolled into billets through the muck rolls. These are then transferred to the bath furnace and submitted to a slag bath, after which they are removed and run through the nine-inch mill, whence they are turned out and put into merchantable shape. Experiments thus far, says the *Industrial World*, justify the claims made by Mr. Wassel in behalf of his invention, and a company is in progress of organization for the purpose of operating the patent. Another process consists of

A Machine For Reducing Large Rails

To those of smaller dimensions. Says an exchange: There are thousands of tons of old rails of large pattern that have done long service and are more or less battered and worn. These rails are in too bad a condition to continue in use with safety, and yet too good to throw away. There is abundant use and demand for small rails for lighter purposes, and the large rails can just as well be utilized, as they are already in good shape to reduce and elongate. Messrs. Schell & Wolf, of Scranton, Pa., have devised an attachment to the rail rolling mill, whereby old rails of the large patterns can be readily reduced, and each rail greatly extended in smooth, finished condition, entirely new and good for a full term of additional service. The first requisite in the reduction of the large rail is to compress the web vertically to bring the crown and base closer together, enabling the rail to be inserted into the annular forming creases of the rolls. At a suitable point on the lower roll is an annular groove to engage the crown of the inverted rail. Correspondingly above is a smooth peripheral space of the upper roll that engages the base of the inverted rail, and the mutual compressing of the engaging rolls compacts the web of the rail, which is of course previously heated in suitable fire-heats. In order to maintain the rail in a true vertical position, the inventors provide longitudinal guides, which closely embrace the side recesses of the rails, and hold them from canting over or from misshaping the web. These guides are secured to vertical guard posts, and are arranged to be removable when not in use. A roller journaled at the point of introduction to the guides enables the rail to glide easily toward the rolls. One, two or three of these compressing courses may be provided, as desired. After the rail is reduced in size, it can be run through the regular reducing series in the usual manner until the required size is arrived at. Aside from the value of this device in the service it is capable of rendering, it is additionally important from the fact that the rail guides can be added to the regular guards with but little expense, and without any material alteration of regular working arrangements; hence hundreds of dollars and valuable space are saved in not requiring a special machine to compact the web of the rail to get it into working shape.

ABOUT SPIRAL SPRINGS.—The *Boston Journal of Commerce* says: How many have undertaken to wind a coil spring only to find that they have got it much larger in diameter than what they sought for, and the only way out of the difficulty has been to draw the wire out straight again and try it once more on a smaller arbor. It is much better to leave the coil as it is and fasten one end to a shaft of the right size and reduce the diameter by means of a hood-clamp such as the carpenter's use. Place the clamp over four or five coils and tighten them up solid and set the shaft in motion. The clamp will be carried along as if it were clamped on to a screw-thread, and the coil will be much reduced by the operation. Again, the same journal said: We have been asked how we should enlarge a spiral spring so that it will slip on easily over a steam pipe. For a slight enlargement it can first be screwed on to quite a large arbor by turning it in the right direction, and then given a set by screwing the hand-clamp tightly on three or four coils, and allow the spring to revolve till the clamp has traversed from one end to the other. The clamps also work well in winding a spring by first taking three or four turns by hand, winding the coils as far apart as may be desired, then clamping them firmly with a wooden hand-clamp, turning the arbor either by power or with the crank motion. The coils sink into the wood, form a nut, and the spring comes screwing out of the clamp with a true and even pitch throughout.

WELDING STEEL TO BRASS.—It is said that the Thomson Electric Welding Company has just made a successful experiment in welding steel pipes to brass in a way that the steel will split longitudinally without affecting the welding. The aim was to weld brass boiler flues to steel safe ends, which is of much importance, as steel will stand more heat than the brass.

SCIENTIFIC PROGRESS.

Strange Phenomenon.

A Phosphorescent Arch Observed in the Sky.

A curious phenomenon of nature was witnessed near here, says a special from Hearne, Texas, to the *Philadelphia Times*, by the north-bound passenger train on the Houston & Texas Central, which passes this point at 2:25 o'clock in the morning. It was in the form of a luminous arch of a phosphoric or electrical character. The luminous mist was first observed by the engineer when it was still several hundred yards ahead of the train, and thinking it a prairie fire, he slowed up, thus arousing the passengers, who, with the crew, crowded to the windows and platforms to look at the vast hueless rainbow spanning the heavens.

As the arch was more closely approached, its dim, white radiance was seen to be clearly defined against the sky as though painted there by the sweep of a brush dipped in white fire. The stars could be seen shining close against the rim of it, and all around and under the arch. The shape, as near as could be guessed at, was half a mile in diameter, though it seemed gradually widening and was in form the half of a perfect circle, one leg resting on the earth, while the other appeared to have been broken off near the base.

The arch rose directly over the track, and as the train approached it seemed to gather a quicker tincture of luster, as of the diamond or some clear, glittering star, though it threw no gleam upon the air beyond its own irradiation, as could be seen by the stars shining in close proximity to it. When the train passed directly under the bridge of light, the surrounding country spanned by it became plainly visible, appearing to be bathed in pale moonlight.

A curious feature of the luminosity was that while it gave all objects a weird, unreal aspect, the shadows which it caused them to throw were black and as clearly defined as silhouettes. In a few minutes after the train passed under the arch it seemed to fade away, melting gradually into the starlit sky. The night, as it will be remembered, was fair and fogless. There was no moon, so the arch must have been self-luminous.

[Such occurrences as the above, although rare, are not without precedents. We well recollect an occurrence of the kind which was seen in many parts of New England in the summer of 1834, and which exhibited precisely the same phenomena as above described. The writer was at the time pursuing his studies at Brown University, Providence, R. I. The first appearance of the phenomena was about nine in the evening, and in the northern portion of the sky. It formed a complete arch across the sky and gradually moved toward and a little past the zenith, just beyond which it slowly faded away. Its duration was an hour or more, as we now recollect it. The students were all called out upon the "campus," in front of the college buildings, where one of the professors improved the opportunity by giving us an impromptu, but very instructive and interesting, lecture on "the northern lights," with which phenomena it was, in the mind of the professor, intimately connected.]

The Forming of a Waterspout.

It is not often, if ever before the occurrence hereinafter noted, that any one who was capable of particularly observing the phenomena, has observed the actual origin of a waterspout either on sea or land. The following facts were recently communicated to the *New York Times* by Mr. F. W. Williams, who was an eyewitness of the occurrence. On the 1st day of January, 1840, the ship *Splendid* of New York, while on her voyage from that port to Canton, China, was lying becalmed off the west coast of the island of Borneo. It was very hot, and there was not wind enough to be felt with a wet finger. At 6 in the morning, about eight rods from the ship, a rippling of the water over about half an acre was seen. We watched it closely, supposing it to be made by fish; but no fish being seen, a tide rip was thought to be the cause. All hands were looking at it. The rippling increased in violence, steam in small puffs arose all over the rippling surface, moving about with a jerky motion, then it began to gather in a body and rise upward with a circular motion, assuming a cone shape. This caused all to look upward to the sky. To our surprise we saw a small, white, fleecy cloud directly over the rippling water, from which was coming down a cone-shaped white cloud. The white cone from cloud and water approached each other and joined, making the form of an hour-glass; the water of the ocean began to go up with a circular motion, and went up the white cloud in the sky. As the water rose, the column became dark, showing a hollow in the center like a thermometer tube. When the water reached the cloud in the sky, we could see it spread over the cloud like water poured on the ground; as the water spread the cloud became almost black in color.

The column remained near the ship until the cloud in the sky had become large and black. Then a current of wind above started the cloud, moving it very slowly to the eastward, dragging the column of water along, the water still rising from the ocean, and the black cloud growing larger all the time. It went about six miles from the ship. Then the column parted in the middle—one cone shape was drawn upward, the other dropped back into the ocean. During this time (about one hour) and until 12 o'clock noon a dead calm prevailed on the water. Not a cloud was to be seen in the sky except the one mentioned. It was a grand and beautiful sight, never to be forgotten.

We had seen many waterspouts at a distance before this one, and supposed, as we had been taught in school, they were caused by whirlwinds. Some time after arrival at my home in Syracuse, N. Y., Lieut. Manry, United States navy, came there and gave a lecture on the "Winds and Currents of the Ocean." When he was through I went to him and asked what caused waterspouts on the ocean. He answered: "Whirlwinds." I then asked: "If one is formed in a dead calm, what then is the cause?" His answer was: "When such things happen, for which we know not the cause, we say electricity may have done it. From observations on the ocean I am certain that electricity will be found to be the cause of many things that there occur."

DISEASE MICROBES.—The microbe, says a contemporary, is the first living thing which makes its appearance in organic matter undergoing decomposition. It is so small as to be scarcely distinguishable in its various species. The fact that the germs of disease cause terrible maladies was discovered by M. Pasteur. Among the contagious diseases spread by microbes are smallpox, tuberculosis, bronchitis and yellow fever. The microbe which attacks the human system is threadlike and cylindrical in form, and breeds at the rate of a thousand a minute. Pasteur holds that the quickest way to destroy them is to inhale oxygen freely, but physicians say there are some diseases which this gaseous treatment would destroy, while there are others which would not be likely to be affected materially by it. If a man shut himself up in a room and kept the air therein loaded with sulphur fumes, the chances are, of course, he would not fall a victim to any distemper caused by bacteria; but an occasional inhalation of such is not, by any means, likely to prevent infection. The most active of all microbes yet discovered is said to be "la grippe" microbe. When seen by the aid of a microscope of 5000 diameters only a faint outline of their various forms can be discerned. The covering or coat of the bacteria, so far as can be ascertained, is a gelatinous matter nearly transparent. The powerful lights required to illuminate the disc on which the semi-transparent germs are shown sometimes prevent their being seen, the rays of light being much coarser than the microbes themselves. There are two special recognized forms of poisons, gases and fluids; both are known to be filled with these germs, and large numbers of them are inhaled daily, many of which manage to impact themselves in the system. It is coming to be a generally recognized fact that all diseases are due to fermentation, and that the presence of microbes in the system is the cause of the same.

THE CORPUS CALLOSUM is a small spongy body situated just at the base of the brain. The object and functions of this portion of the human anatomy has long puzzled the minds of our most learned physicians. There is a certain class of spiritualistic teachers who have made the human anatomy a special study, who hold that this organ is a separate but as yet undeveloped brain, which will gradually develop with the mental and spiritual development of the race, and that finally it will become the ruling organ of mental and moral activity—that it will at some future time become the medium through which man will become perfectly familiar with what are now sometimes called the "occult sciences," or those sciences upon which depend the phenomena of mesmerism, modern spiritualism, clairvoyance, foretelling of future events, etc. Quite recently, according to a late article in the *Electrical World*, Dr. A. H. Stevens of Philadelphia, a gentleman of some considerable note as a medical student, has put forth the idea that this organ constitutes the apical location of the soul or mind of man. He says: "The corpus callosum is the seat of the imperishable mind, and is the great reservoir and storehouse of electricity, which is abstracted from the blood of the arteries and conveyed through the nerves up the spinal cord to the corpus callosum."

THE ORIGINAL GATLING.—According to *Notes and Queries*, the Gatling gun and revolver were foreshadowed as long ago as 1720. About that time one James Puckle, an original and inventive genius, published an engraving on which was represented a large revolving gun, mounted on a tripod, the breech of which was to be turned by hand, and which contained six chambers similar to the earliest revolving pistols. The piece could be elevated or turned in any desired direction. The part containing the chambers was removable at will.

CORK.—A sheet of cork one pound in weight will support the body of a man in water.

GOOD HEALTH.

Turpentine Treatment.

A writer in the *Medical and Surgical Journal* says: "I have been using pure oil of turpentine in affections of the throat and lungs for some time, and find better and more satisfactory results than from any other remedy I ever tried. I use the ordinary hand atomizer, and throw a spray of the liquid into the throat every few minutes, or at longer intervals, according to the gravity of the case. The bulb of the instrument should be compressed as the act of inspiration commences, so as to insure application of the remedy to the whole surface, which can be done in cases of children very successfully. It is surprising how a diphtheritic membrane will melt away under an almost constant spray of pure oil of turpentine. I now use the turpentine spray whenever a child complains of sore throat of any kind. In cases of tuberculosis of the lungs, bronchitis and the latter stages of pneumonia, I have found the turpentine inhalation very beneficial. I use an atomizer, or paper funnel, from which the turpentine may be inhaled at will. I hang around the bed and in the room flannel cloths saturated with oil of turpentine, in all cases of catarrhal bronchitis—in fact, in all affections of the air passages, and my patients invariably express themselves as being very much relieved."

Terebenth.

Quite recently we are told of a new preparation from turpentine, which is probably less harsh in its action than the oil, and, perhaps, quite as effective. This preparation is known as "terehene." It is a clear, colorless liquid, with an odor of "fresh sawn pine wood." It is prepared from turpentine by the action of sulphuric acid. This is practically a new remedy, and has been but little used by physicians in this country, but some in England have evidently given it a good trial. Its special efficacy appears to be in diseases of the mucous membranes, as is the case with turpentine. One physician reports having used it in over one hundred cases of what he terms "winter cough," which is evidently part acute and part chronic. He found that, in very many cases where every form of treatment which had been employed had proved valueless, terebenthine had a marvelous effect, expectoration becoming freer, the breathing better, and the general condition much more comfortable. The medicine was usually given in ten-drop doses, on sugar, every four hours at first, and less often as the cough improved. In the most obstinate cases the dose was doubled. Terebenthine is practically harmless, but twenty drops is as much as one ought to take, and the physician in question says it is best to begin with five or six drops on sugar every four hours and gradually increase to the maximum dose given. The remedy has also been found to act exceedingly well in acidity and flatulence, from which so many victims of chronic bronchitis suffer more or less. In terebenthine it is evident that physicians have a valuable addition to their list of remedies.

TAKE A DAY IN BED.—There is no better preventive of nervous exhaustion than regular, unhurried, muscular exercise. If we could moderate our hurry, lessen our worry, and increase our open-air exercise, a large proportion of nervous disease would be abolished. For those who cannot get a sufficient holiday, the best substitute is an occasional day in bed. Many whose nerves are constantly strained in their daily vocation have discovered this for themselves. A Spanish merchant in Barcelona told his medical man that he always went to bed for two or three days whenever he could be spared from his business, and he laughed at those who spent their holiday on toilsome mountains. One of the hardest worked women in England, who has for many years conducted a large wholesale business, retains excellent nerves at an advanced age, owing, it is believed, to her habit of taking one day a week in bed.—*Boston Traveller*.

OZONE AND HEALTH.—One of the great causes of the excess of sickness in cities over country residence comes from the lack of ozone in the city. Sir Edwin Chadwick, known in England as "the father of sanitary science," says there is no ozone at the surface of the thickly-built streets of London—at the base of St. Paul's for instance—but there is at the summit, and if pumping machinery which would pump down the ozone from above were put in motion, the health of great cities would be much better than at present.

GRIEF AND PAIN come alike to all, and cannot be escaped by any; broken hearts are to be found in palaces as well as in cottages, and the bond of brotherhood seems strongest when love and pity unite all hearts, and reverence for what is good lifts up our souls.

CARELESSNESS THE CHIEF CAUSE.—A man in Cincinnati who has preserved a record of 320 railroad accidents in this country during the past year finds that only 13 occurred from causes beyond human control.

ROOM AT THE TOP.—Yes, there is plenty of room at the top, and there always will be, unless facilities for getting there are improved.

USEFUL INFORMATION.

THE MEANING OF "F. O. B."—A correspondent of the *Iron Age* writes to that journal as follows: "Please give me through your columns the correct meaning of the business term 'f. o. b.' I claim that it means no charge for boxing or cartage; that there should not be any charges of any kind added to the cost of the goods. Some shippers claim that the term applies only to cartage and has nothing to do with boxing, etc." The *Iron Age* answers as follows: We presume there are few business terms that create more discussion than "f. o. b." During the summer of 1887, the matter was brought up, and we secured opinions from a very large number of business men all over the country and printed the correspondence. The replies were very numerous, and we continued the discussion of the subject through several months. Our correspondent could not do better than to look up the files of the *Iron Age* and read the contributions to this subject published between July and October, 1887. The opinions expressed in these letters were pretty evenly divided between the two interpretations of "f. o. b."—whether it meant deliver free of all charge, or whether it only referred to the cartage and left the boxing to be charged extra. It is generally conceded, however, that the best interpretation of the term means free of all charge, and that if boxing or crating is to be added, it should be so stated at the time the goods are sold. This, however, is a matter of opinion, for so far as we know the interpretation has never been absolutely fixed.

STAMP AND OTHER COLLECTORS.—There seems to be a mania for the collection of useless things. It has been called the "philatelic mania." One of the latest hobbies in this direction is a man who the *Washington Post* says is devoting his time to collecting old bottle corks, which he classifies according to the liquor their bottles contained. So expert has he become that when he picks up a cork in the street, he will tell on the instant to what class it belongs. Of course, no man's mind can be of a very high order to be satisfied with doing nothing but collect bottle corks or letter stamps. It is said that in Germany, Austria, and in some of the petty kingdoms of Europe, the stamp collectors are getting into bad repute with their respective governments. It is thought the passion leads to disloyalty if not to anarchy, for the reason that the collector is always anxious for a change in rulers, as that leads to changes in stamps, which widens his opportunity for business. There are said to be at least 200 old stamp-shops in Europe which are looked upon as hotbeds of addition. They even have a newspaper conducted in the interest of the business, called the *Philatelic Record*. A travesty on the old saying reads as follows: "Uneasy lies the head that's on a stamp," for the fear that a new face may appear thereon.

THE GULF STREAM NOT RESPONSIBLE.—The theory that the Gulf Stream is responsible for our abnormal weather, by hugging our coast closer than in past years, is denied. It is pointed out that the warm current issuing from the Gulf of Mexico can only affect the weather by conveying heat and moisture to the air overlying it, and then transferring these conditions to the land by air currents. But the truth is that the prevailing winds passing over the Gulf Stream blow toward the northeast, and away from our coast. They modify the climate of Northern Europe, just as the air passing over the Japan current gives a mild climate to British Columbia and California. Of course, at times, we have southeasterly winds, and the temperature and rainfall of the Atlantic seaboard is materially affected thereby; but the difference of a hundred miles or more in the position of the Gulf Stream would have in itself little effect on our home climate. The distribution of barometric pressure and marked departures from normal pressure, from whatever cause they may arise, are much more likely to bring about abnormal weather, and we must study such changes rather than the ever-winding and waving Gulf Stream.

REDUCING THE NUMBER.—The arrival of Chinese by the Canadian Pacific Railway steamships from China in British Columbia during the year 1889 were 500 less than the departures for China. If to that depletion is to be added the great numbers who are crossing the line into the United States, British Columbia will soon be a "happy land."

MIXED FARMING DESIRABLE.—The big wheat farms have not been profitable in Dakota for some years past, and, as a result of the great drought this year, they will probably be subdivided and mixed farming will be introduced. This will make things much more lively in that part of the country and will introduce mechanics and machinery of all kinds.

PROHIBITION TOWNS.—The *Banning Herald* says: Southern California has ten prohibition towns, with a good prospect of adding Redlands and Oceanside to the list.

A GOOD IDEA.—Each division of the Boston police force is to be supplied with a long wooden pole, to which in the day-time will be attached a blue pennant, marked "Police,"

and at night a blue lantern, which will be carried to fires for the purpose of indicating where the superior officer can be found, the pole being shifted as occasion requires.

An international exhibition of postage-stamps will be held in Vienna next year in commemoration of the 50th anniversary of their introduction.

ELECTRICITY.

Safe Electric Lighting.

The superiority of electric lighting over all others is now very generally recognized, and the great problem is how to furnish it in large installations and in a manner which shall render its use both simple and safe. The fact that, as now distributed, it is not safe should not be regarded as any reason why it should be abandoned. As the practice now is, it may be said that all sorts of wires are run in all sorts of ways except the correct ones. That there may be found a correct and a safe way to distribute electric-light currents, there can be no doubt. "We can't" is an expression which should not be allowed. "How can we?" is the important question which just now should engage the attention of all electricians.

Placing the wires underground would eliminate many of the causes from which accidents arise. There are well-understood safeguards which might be brought more generally into use. The conversion of high pressure, continuous currents to low-pressure currents by means of "direct current" or dynamo converters is being rapidly developed. Much might be accomplished by a more careful placement of wires both inside and outside of buildings. We have already many methods for securing safety which have not yet been generally introduced, and there can be no doubt but that many other and still more practical ones will from time to time be devised and introduced for accomplishing the much-desired result of practical safety.

The limited experience of the cities of Chicago, Philadelphia and New York in the use of underground cables, to say nothing of the wider experience in this direction in the cities of Berlin, Milan, Rome and other European cities, indicates that the success of properly constructed underground conduits, whether for currents of high or low tension, has been quite well established.

We can hardly expect to see the best results obtain in the short time which has elapsed since electric lighting was first introduced. The best and most inventive minds in the world are just now bending all their energies to this work. Let us go slow, work cautiously and patiently, and await the time which will surely come when a perfectly safe, cheap, efficient and universally applicable system of electric lighting will be presented to the world.

ANNEALING STEEL.—There are two ways of annealing steel. It can be heated to a dull red heat, covered with dry, warm sand and left to cool slowly, or heat and cover up in the forge fire and leave it there until the fire is out and all is cold. The other method is to heat the steel red hot; heat gradually, let it "soak," as the smith says, until it is evenly heated, then remove from the fire and go to some dark corner. Let the steel cool until you lose sight of the dull red in the dark, then cool off in cold water. A good "dark place" may be made by throwing your coat over a harrel, leaving just room enough to look in at the iron. This method is called the "water anneal," and is based upon the theory that steel softens when cooled at a certain temperature.

THE ELECTRIC LIGHT is being more and more used among the manufacturers of the wood-working class. It is practically the only light in use at the present time in sawmills, cash and door factories, furniture factories, and all the wood-working establishments where a superabundance of inflammable material and more or less dust is unavoidable. Manufacturers recognize that they cannot afford to risk the lighting of their plants with lamps, or even gas, with the danger from fire which these illuminators offer. And as a rule, where motive-power is abundant and cheap, electricity, besides affording the best and safest light, is in the long run the cheapest.

LIGHT WITHOUT HEAT will probably be the next thing to which serious attention will be called after the perfection of the present system of electric lighting. The possibility of such an attainment is foreshadowed in the light produced by the fire-fly. But the full understanding of the phenomena connected with that insect is too far ahead of our present philosophy to hope for anything more than an imaginary picture of what may be possible during the next few decades. That such a result will come in time may be considered as a thing almost certain.

FOOD FOR THOUGHT.—The *Electrical Review* opens up a new field of thought and discussion by asking why the mere magnetization of a bar of steel makes of it a machine for the transformation of energy. It is said that a magnetized horseshoe will lift a pound of iron and hold it for an indefinite period of time. In every second of that time it is not only expending energy, but also increasing its actual power; and the question is, where that shaping potency

comes from—whether from gravity, atmosphere, solar rays or earth currents. We seem yet to have hardly reached the confines of investigation into the forces of nature.

A NEW ARC LIGHT.—George Westinghouse announces that his company is about to supply New York City with a new system of arc electric lighting, which will be perfectly free from danger. It will consist of main currents underground, each lamp to be operated therefrom by an inducted current. An announcement from such a source carries with it a belief that it contains something more than mere words, and encourages the thought that electric lighting will soon be as safe as light from a wax candle.

ENGRAVING BY ELECTRICITY.—Engraving on glass and crystal by means of electricity, the discovery of which has already been noticed in these columns, is said to be now in practical operation. The glass is covered with a concentrated solution of nitrate of potash and put in connection with one of the poles of the battery, and the design is traced out with a fine platinum point connected with the other pole. By this process it is claimed that marvelously delicate work can be done.

THE BUILDER.

Properties of Quicksand.

The properties of different kinds of sand is a matter of very great importance to builders. The properties of quicksand are described in the *Mechanical News* as follows: "The difference between building sand and true quicksand is most easily explained by comparing building sand to road metal, while the quicksand must be represented by fragments no larger than large huckshot, but shaped like very smooth potatoes. In a word, the quicksand is small and thoroughly water-worn, so that every fragment has been deprived of all its angles and fairly well polished. Its particles are very small as compared with those of the building sand. The smaller the size, and the more complete the rounding, the more nearly will the sand approach a liquid condition when it is moistened. The first glance at a fairly mounted sample of quicksand under a microscope is sufficient to show that the quickness of the sand is amply accounted for by the innumerable friction-wheels which the particles themselves furnish. Sharp or building sand, on the other hand, will show few round corners, many angles, corners, and a general condition like that of broken stone.

"Sea sand is often unfit for building, even though perfectly deprived of its salt, the reason being that the particles have been worn and polished till they have no more hiding powers than so many cobblestones. It is well to remember that quicksand when dry, if very fine, shows the same properties as a liquid. In holding up the centers of large bridges it is sometimes put into cylinders with a plunger on top of it. It will, when thus confined, hold up the load like a column of water. When it is desired to strike the center, a plug is drawn out of the side of the cylinders, and the sand flows out like so much water. The advantage, of course, is that the sand does not need a packed piston and does not leak out, though the work be prolonged for years. Quicksand when dry and confined forms an admirable foundation, and when wet can be loaded over its whole surface, and give a good support if side openings can be avoided."

Preparing Loose Sand for Foundations.

A new process of preparing foundations has been patented by F. Neukirch of Bremen. Its object is to make loose sand firm and resisting as solid rock. At present, the universal method of doing this work, if under water, is to remove all loose material and then make a beton or other similar substructure. The process under consideration, which is only of use where the materials are fairly clean silicious or calcareous sand, aims at consolidating the grains by covering them with a film of cement, which is forced into the spaces between the particles by compressed air, steam or water under pressure. Sheet piles are employed to prevent the spreading of the cement over more ground than is necessary. The system has been largely used in the harbor of Bremen with gratifying results and is to be tried in preparing dry foundations.

BUILDING ASSOCIATIONS.—The success of co-operative building associations in the United States has been marvelous. They were first started in Philadelphia in 1831. There are now 450 organizations in that city and many more in other portions of the State. There are 80 associations in Rochester, New York; no less than 170 in New Jersey. The total number in the United States is estimated at 4000, and that number is increasing at an estimated average of two each day. It is estimated by a London daily that there are about 2500 building associations in the United Kingdom. The amount invested by these associations in that country in 1889 was about \$100,000,000.

CONCRETE WALLS FOR BUILDINGS are built of one part of cement to six or seven of clean broken stone or gravel. Boil some soap to the consistency of paint, and apply freely with a brush, to the planks of the molds, to prevent the adhering of the cement.



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Business Announcements.

[NEW THIS ISSUE.]

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Band Coupling—Wells, Russell & Co.

See Advertising Columns.

Passing Events.

Although heavy snowing has stopped in the mountains, there are still more or less inconveniences as the result of the great storm. The rivers are all high, and railroad traffic is uncertain. The Oregon road will not be open for some weeks, and we are without many exchanges from distant quarters.

The mines of this State and Nevada are pretty well at a standstill. High waters, frozen ditches, snowdrifts and had weather have combined to stop ore transportation and mining or milling work. As a consequence, there are many idle miners just now. The coming season, it is hoped, will make up by its prosperity any damages occurring now.

The recovery of the winze pump in the Pioche Cons. mine means a good deal for Pioche, Nev., for the mine will now be cleared of water. The local papers say the condition of the pump was such as to suggest that the abandonment of prospecting below water was not on account of not being able to handle it, but was some sort of a job. The valves of the old pump were said to have been set wrong.

AN UNSUCCESSFUL STRIKE.—At a meeting of the Boiler-Makers' Union held last Friday evening, the boycott against the Risdon Iron Works was withdrawn. It will be remembered that the boiler-makers struck over 12 months ago, since which time their places have been filled by non-union men. No concession whatever was made by the Risdon Works.

Copper.

While the year 1888 will be memorable in the history of the copper trade for the rise of the French syndicate to control all the supplies of this metal, the year 1889 will be also memorable for its fall, which latter entailed a loss upon France of \$75,000,000 to \$100,000,000. The want of capital was the primary cause of the collapse, as the contracts made were too high. Instead of closing the contracts with American and other mining companies simultaneously, they were arranged with one after the other, giving the later ones a chance to get big prices. The effect of the syndicate's operations, extending over a period of one year and five months, was an increase of the stocks of copper in this country, England and France—from the minimum of 58,000 tons at the end of 1887 to the maximum on May 1, 1889, of 179,000 tons—of 121,000 tons, about one-half of which was due to increased supplies, and the other half to diminished consumption.

James Lewis & Sons of Liverpool, in their annual report, give statistics which show that the direct import of copper into England and France in 1889 was 14,077 tons less than in 1888; that, exclusive of the Chili bars transferred from England to France, the export of copper from England exceeded that of 1888 by 26,118 tons; and that the apparent consumption of England was 23,197 tons greater than in 1888, while the apparent consumption of France was 3338 tons less. Taking the average English and French consumption and English export for the two past years, 123,640 tons, it is 2700 tons per annum less than that of the previous two years, nearly 11,000 tons less than that of the years 1885 and 1884, and nearly 7000 tons per annum less than the average of the four years 1884 to 1887. It is therefore evident that the large deliveries of the past nine months have hardly made good the great depletion of stocks all over the world, without in any way supplying the greatly increased demand due to the present revival in trade, and the special demand arising from the extended use of electricity and of sulphate of copper.

The value of telegraphic wires and apparatus exported in 1889 was £1,040,082 against £521,055 in 1888, or more than double, as the cost of the copper used in 1888 was higher than in 1889, and the value of machinery and mill-work exported in 1889 was £15,254,658 against £12,939,267 in 1888; in this case, however, the value of the iron used was greater in 1889 than in 1888; 1,286,426 tons of steamers and sailing vessels were built in 1889, against 903,687 tons in 1888 and 578,600 tons in 1887, the orders in hand at the end of 1889 representing 810,000 tons irrespective of government orders. This is the largest amount of tonnage ever produced in one year, and the promise for the present year is most favorable.

The consumption of the United States has exceeded that of 1888 by 27,500 tons.

The impetus given to production by the high prices paid by the syndicate increased the import into England and France from 117,000 tons in 1887 to 160,000 tons in 1888, but during the past year it has fallen to 146,000 tons under the influence of the low prices which followed the collapse of the Syndicate. The most notable decrease has been in shipments from Chili, 8500 tons, and from "other countries," nearly 8000 tons, while from the United States it is 500 tons, from Australia 500 and from Japan nearly 2000 tons. The increase from Spain and Portugal is, however, 1500 tons, from the Cape of Good Hope 2700 tons, from Quebrada 700 tons, and from Mexico 1800 tons. The total production of the world for the past year is estimated at 263,000 tons against 260,000 tons in 1888.

The quantity of copper produced during 1890 will mainly depend upon the level at which the value is maintained. At £50 for good merchantable copper, there is little doubt that most, if not all, of the large producers can work to a fair profit, while this price will in no way interfere with consumption.

This latter promises to be very large with the great extension of the use of electric light and power, the increasing demand for sulphate of copper, the brass required for the numerous war and other steamships in course of construction, and the locomotive and machinery for which makers are full of orders up to nearly the end of the year.

A Dry-Crushing Silver-Mill.

Silver-milling ores are either free or base, and the latter require a preliminary or chloridizing roasting. The free-milling ore passes through the same process as gold ores (described in last week's PRESS) until the battery is reached. The ores are crushed wet on the battery; but battery amalgamation is not practiced. From the battery the pulp passes through sluices into settling tanks, where the superfluous water is drained off. The pulp is then shoveled into the pans, where salt and bluestone or other "chemicals" are used. Here the ore is first ground and then amalgamated. After several hours the pulp is run into settlers, where it is diluted with water, and the heavy amalgam and quicksilver settle to the bottom. This is then collected and strained and the dry amalgam re-torted.

Base or rebellious silver-milling ores contain too much sulphur, arsenic, antimony, etc., to be treated by free-milling process. After crushing in a rock-breaker, they require a previous chloridizing roasting to adapt them to the pan-amalgamation. They are "dried" before stamping, and then stamped dry. The mortars have double discharge. The pulverized ore is discharged through the screens of the mortars is carried by conveyers to elevators, which lift it to the furnace floor. The White and the Howell furnaces are supplied with pulp by a gravity chute.

There are several types of furnaces in use, notably the Brookner, the White & Howell, the Stetefeldt, the O'Hara, and the ordinary reverberatory furnace.

The time of adding salt depends on the mineralogical character of the ore. When there is much arsenic or antimony present, salt is economized by a preliminary oxidizing roasting of the ore. The salt is crushed either separately or with the ore. It should be thoroughly incorporated with the pulp. To obtain a high degree of chloridation, sufficient sulphur must be present to effectually liberate the chlorine of the salt. Calcepar, braunspar and fluorspar, etc., retard the chloridation by absorbing a large part of the sulphuric acid produced. Minerals containing arsenic, antimony, tellurium, selenium, etc., increase the loss of silver arising from volatilization. Zincblende requires long roasting to convert it into sulphate. The subsequent process of amalgamation is similar to that described with reference to the treatment of free-milling ores, though the grinding process is usually omitted or curtailed in the pan-amalgamation of roasted ores. The cut on page 90 is a dry-crushing silver-mill designed by the Union Iron Works of this city.

Listing Mines on Stock Boards.

EDITORS PRESS:—Can you kindly inform me what are the requirements of the San Francisco Stock Exchange as to listing mining stocks. Is the stated amount of output, or development and production considered in any way?
Mariposa, Cal.

Mr. Fred Hadley, the secretary of the S. F. Stock Exchange, informs us that the fee for listing a mine on the board is \$1000. Afterward the annual dues are \$100. The application is referred to the Stock-List Committee, who, if satisfied that it is not a "wildcat," and possesses merit, will put the stock on the list.

It does not seem, from experience, that any very rigid examination is made in these matters, not half as much as should be the case. A good many "wildcats" have been listed first and last, greatly to the detriment of the whole mining-stock business.

It is, perhaps, not practicable for the Stock Board to send an expert to examine every mine to learn whether it is fit to be listed; but if more care had been taken in the past the mining stock market would be in better condition than it is to-day. If people were sure of a certain degree of protection in these matters, and knew when a mine was listed, so its stock could be bought and sold; that it was a bona fide operation, they would feel more like investing occasionally. As it is, the principal requirement seems to be the fee.

JOHN J. DORSEY, who has been for 35 years Wells, Fargo & Co's agent at Grass Valley, died last week. He was the owner of the Maryland mine, which adjoins the famous Idaho, but which has never been properly opened or developed.

Geology of S. W. Colorado.

In a paper read some time since before the American Institute of Mining Engineers, Mr. T. B. Comstock went at length into the geology and vein structure of Southwestern Colorado, or that portion of it in the southern third of the Colorado Highland, with a part of the neighboring plateau upon the west. We have not the space to give his views on the general geology of the district, but the character of the formation is given in the accompanying geological map. See opposite page.)

In this district are three or four types of mineral veins, structurally considered, but there are really close genetic relations in all of them.

Beginning at the eastern edge of the area covered by the geological map, the Summit district occupies a small patch of territory set like a nook in the mountains. From this westward nothing appears until the Continental divide is crossed in the northeastern portion, where the Lake City district introduces us to the general features of the deposits which are crowded over the wide region occupying the largest part of the map, culminating in San Juan county. Intimately connected with the latter area, but unique in character, is the restricted Red Mountain district, largely in Ouray county, and off to the southwest lies the Reco field.

Although the great central San Juan area proper is very complex, and made of many distinct groups, there is yet such a kinship in the whole as to indicate a common genesis, with structural variations due to secondary causes. In the Summit and the Reco districts, however, there is not this close relationship either to the San Juan area or to each other. Another independent district, in general terms, is that of the La Plata mountains.

Taking the districts in the order of their vein formation, we have both the La Plata area and the Reco belt occurring among the earliest volcanic rocks—porphyrite and andesite—chiefly the latter. Probably the Summit district came next and the central-region fissures were certainly not filled until after the tectonic outflows, including the rhyolite. The Red Mountain epoch was, in its finishing acts, not only post-glacial, but of later date than the Tertiary period. The veins are intimately associated with the volcanic rocks.

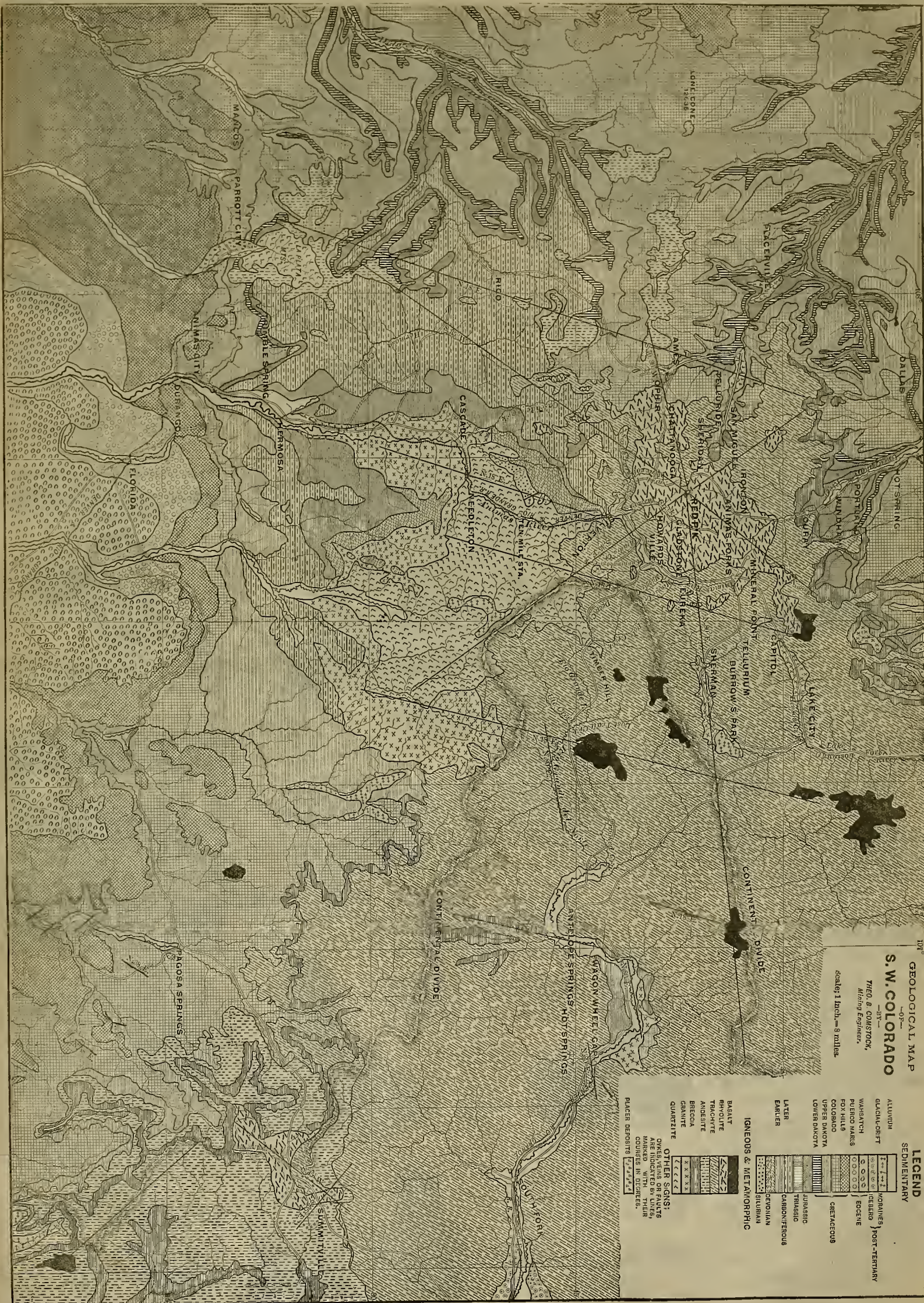
The map shows a little of the present surface features of La Plata district. The district is pre-eminently gold-bearing, though silver ores are not wanting. Tellurium compounds very rich in gold are frequent. The veins are numerous and intricately mingled, and there are some placers.

The Reco belt is not apparently distinct from the La Plata area in origin. Many of the veins at Reco are intimately associated with the carboniferous limestone, giving them much the character of the "contact" deposits similar to those of Leadville. Nuggets of gold and native silver occur in some veins, but the ores are usually complex or simple sulphides. As a rule, the veins are worked in the region of andesite intrusions.

Summit district is a very small area remote from the La Plata region, which it most resembles. In certain features its deposits approach some of the veins which lie near the outskirts of the central San Juan area on the side next to the Reco district.

In the Red Mountain district the deposits are not in well-defined linear orebodies, but occupy irregular cavities, apparently related in some general manner to deep-seated fissures. The vein-matter is far from uniform, and is usually of complex character. Almost all known mixtures of the sulphides, arsenides and antimonides of iron, lead, copper and zinc are found mingled indiscriminately with varying percentages of the precious metals. The geological map exhibits graphically the facts which formed the basis for the generalizations in Mr. Comstock's paper. The deductions have been made from observed facts.

THE Young America mine, north of Sierra Butte, Sierra county, lost its drying-house, dump-house, barn and shed, at the mouth of No. 2 tunnel last week, by fire. The buildings were at the time surrounded and covered by about 25 feet of snow.



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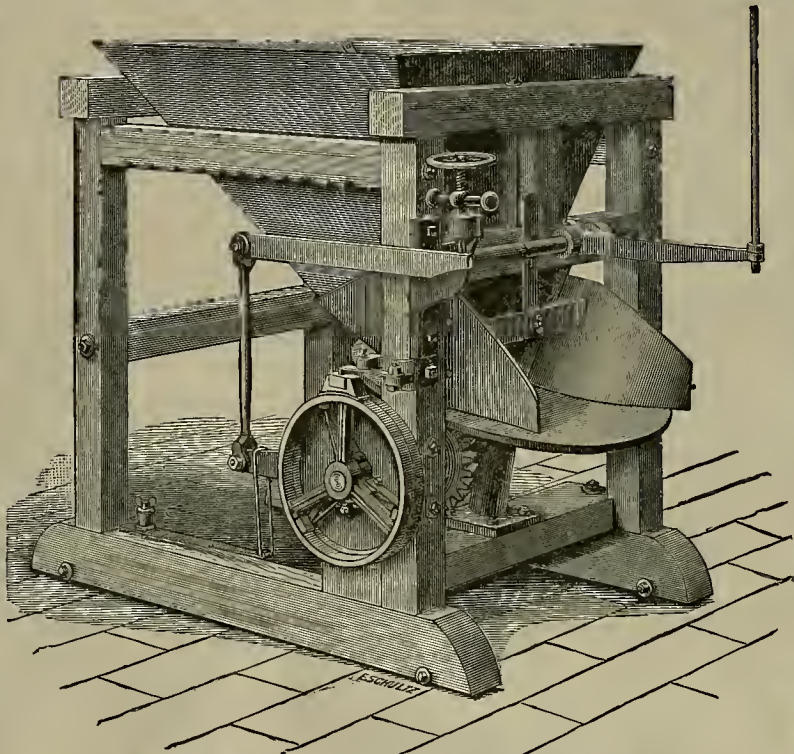
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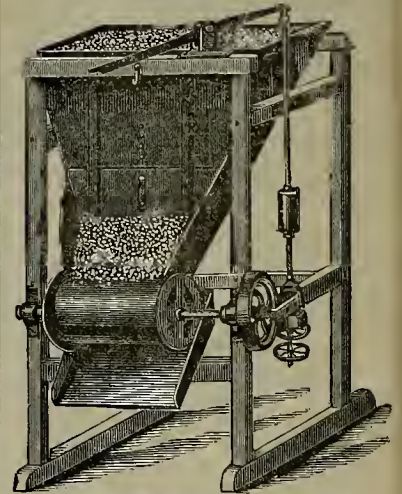
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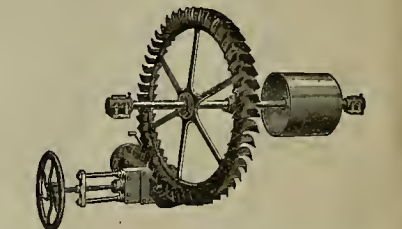
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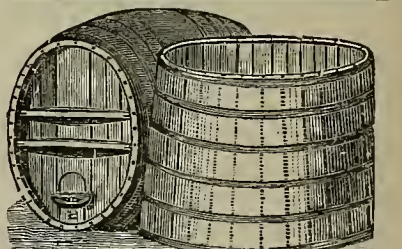
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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING JAN. 14, 1890.

- 419,301.—ARMOR FOR SHIPS—L. B. Abraham, S. F.
 419,241.—FLEXIBLE SHAFT COVERING—F. W. Bidley, S. F.
 419,599.—TONGS FOR HOLDING PLOWSHARE—L. W. Cox, Gold Hill, Or.
 419,246.—ROCK-BREAKER—M. B. Dodge, S. F.
 419,247.—ROCK-BREAKER—M. B. Dodge, S. F.
 419,243.—PUMP—Geo. E. Dow, S. F.
 419,323.—CLIPPING MACHINE—J. W. Eisenhuth, S. F.
 419,517.—WATCH-CASE SPRING—B. M. Greene, Eckley, Or.
 419,519.—WASHING MACHINE—G. W. Maich, Seattle, Wash.
 419,256.—CRUSHING-MILL—F. A. Huntington, S. F.
 419,526.—WINDMILL—W. H. Keep, Stockton, Cal.
 419,266.—FILTER—E. M. Knight, San Mateo, Cal.
 419,337.—SACK-DETACHER—L. Martin, Rickreall, Or.
 419,466.—CLIP FOR ROPEWAYS—B. McIntire, S. F.
 419,535.—DOUGLE TREE—M. B. Morrison, Yakima, Wash.
 419,277.—DRAINS OR SEWERS—B. W. Murray, Seattle, Wash.
 419,548.—WAGON BRAKE—Pardee & Leaman, Lower Lake, Cal.
 419,284.—TRACTION ENGINE—Jacob Price, San Leandro, Cal.
 419,477.—BOTTLE-STOPPER—J. M. Schofield, Merced, Cal.
 419,294.—ROCK-BREAKER—Spiers & Booth, S. F.
 419,386.—DEVICE FOR TRANSMITTING POWER—A. Von Babo, Seattle, Wash.
 419,579.—THRILL-COUPLING—L. N. Woodie, Albany, Or.

The following brief list by telegraph, for Feb. 4, will appear more complete on receipt of mail addresses:

California—John W. Bain, Gonzales, gates; Frank V. Carman, Oakland, miter-box; Henry Craigie, San Francisco, dental plugger; George D. Crocker, Oakland, hinge for window-sashes; John W. Eisenhuth, S. F., device for transmitting motion; Benjamin Holt, Stockton, thrashing machine; Henry O. Hooper, Eureka, latch and lock combined; John H. Jeffrey, Crescent City, device for lifting goods from shelves; Egbert Judson, S. F., dynamite; Elizabeth J. Lincoln, S. F., portable ash-hasket; Fannie L. Matson, San Jose, chart-reading and number stand; Henry Muller, assignee of ball to A. Graff, S. F., twine-plug for plance; Denis O'Leary, San Bernardino, ventilator and center-piece for ceiling; Ferdinand O. Stallman, S. F., mechanism for depressing cables at crossings of cable railways; Ada H. Vampelt, Oakland, permutation lock; Ruel W. Whitney, S. F., instrument for copying drawings; Frank E. Williams, Alhambra, appliance for spinning-tops; James B. Williams, S. F., insulating compound.

Notes.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

PUMP.—Geo. E. Dow, S. F. No. 419,248. Dated Jan. 14, 1890. The device consists mainly in a series of single-acting plungers, preferably constructed so as to operate vertically, and they are not less than three in number, so as to maintain an even balance and pressure. These plungers are driven from cranks upon the crank-shaft, which is journaled in the lower part of the containing-case, the case inclosing all the operating parts of the pump. The cranks are set at equal distances apart upon the circle which represents their throw and have a uniform throw or stroke. The number of plungers operating in connection with one suction-chamber and one discharge-chamber, with separate valve-chambers intermediate between the two, and each having valves operated by its own piston, insures a steady flow and a steady and constant resistance to the rotation of the shaft, and enables the inventor to obtain a large range of rotative speed.

ROCK-BREAKER.—Miles B. Dodge, S. F., assignor to Parke & Lacy Co. No. 419,247. Dated Jan. 14, 1890. This improvement in rock-breakers consists of certain constructions and combinations of devices intended to further perfect the machine and increase its durability and strength.

CRUSHING-MILL.—Frank A. Huntington, S. F. No. 419,256. Dated Jan. 14, 1890. This invention relates to that class of crushing-mills in which a vibrating or oscillating jaw operates in conjunction with a cylinder between which and the jaw the rock is crushed or broken. The patent covers several novel features. The machine may be adjusted to any degree of nicety to feed ore or other material to stamps or other crushing devices when regularity of supply is desired, and it performs the double office of a rock-breaker and an ore-feeder.

CONSTRUCTION OF DRAINS OR SEWERS.—Bernard W. Murray, Seattle, Washington. No. 419,277. Dated Jan. 14, 1890. This is a sewer or culvert consisting of a sole or yoke with a central longitudinal depression and grooves or channels in its edges, in combination with

tongued and grooved strips or sections fitted together and laid up to form the outline, said sections being mortised or doweled together at the ends so as to form a continuous passage.

TRACTION ENGINE.—Jacob Price, San Leandro. No. 419,284. Dated Jan. 14, 1890. This patent covers a number of details of construction of traction engines, of which Mr. Price makes a specialty.

ROCK-BREAKER.—Miles B. Dodge, S. F., assignor to Parke & Lacy Co. No. 419,246. Dated Jan. 14, 1890. This invention is applicable to that class of rock-breakers in which one or more reciprocating jaws are caused to move to and from each other while the rock is passed between them, this action of the jaw being effected by means of an eccentric upon a driven shaft, and the eccentric is connected with the moving jaw of the rock-breaker by connecting rods or arms in any of the well-known ways. As all the wear and strain of the work is brought upon the eccentric at one point of its circumference while it is forcing the jaw forward against the material taken between the two jaws, this eccentric soon becomes worn, so as to be untrue, and if the box is left loose it will pound and greatly add to the wear and noise. If under these circumstances any attempt should be made to take up the wear upon one side, the box would be broken on account of the irregular shape of the eccentric. In this invention peculiar elastic buffers are used and serve to hold the cap closely against the eccentric so that as it rotates within its box it will always have a perfect fit, while the cap is allowed sufficient motion to accommodate itself to the irregular shape of the eccentric caused by the unequal wear.

FILTER.—Edward M. Knight, San Mateo, assignor to the Rapid Safety Filter Company of S. F. No. 419,266. Dated Jan. 14, 1890. This is one of that class of filters in which a fibrous or porous material is employed as a filtering material. The patent covers a filter consisting of asbestos cloth or other fibrous material and an exterior coating of filtering medium in the form of paste spread upon the cloth and an exterior cover of wire screen to uphold the medium.

ROCK-BREAKER.—James Spiers and Edgar A. Booth, Fulton Iron Works, S. F. The patent covers several details of construction which are intended to improve and strengthen the machine. Among other features is the method of making the dies. These dies are formed of wrought-iron bands inclosing alternate horizontal layers of wrought-iron and steel bars placed edgewise. These alternate layers of wrought-iron and steel bars are firmly held in place by a band being heated and shrunk around them, or by being forced into the band by hydraulic pressure. The steel bars are hardened, and the wear being greater on the wrought-iron bars than upon the steel ones, the latter will be slightly elevated above the surface of the wrought iron, forming a corrugated surface and producing a better crushing effect. The wrought-iron and steel bars, by being set upon edge, present the grain of the metal to the substance to be crushed in a manner calculated to insure long wear.

FLEXIBLE SHAFT COUPLING.—Frank W. Bidley, S. F. No. 419,241. Dated Jan. 14, 1890. This is a flexible or universal coupling for shafts whereby they may be made to run in different lines without breakage or accident. The device is valuable for milling and manufacturing purposes where it may be desired to run shafting at different angles. It may also be applied in steamers of light draft where it is necessary to incline the shafting in order to submerge the propeller sufficiently, as by means of this coupling that portion of the shaft with which the engines are connected may be maintained horizontal, while the portion carrying the propeller may be inclined as much as is necessary to submerge the propeller. This device is placed forward of the thrust-bearing of the shaft.

CLIP FOR WIRE ROPEWAYS.—Bartlett McIntyre, S. F., assignor to the Vulcan Iron Works. No. 419,466. Dated Jan. 14, 1890. The invention relates to that class of devices which are used for connecting a load with a traveling cable and known as "clips for wire ropeways," forming part of a system of transmission of loads from one point to another. The invention consists in the novel construction of the clamping-end of the body portion of the clip, and also in a peculiar joint in the hanger. The object is to provide a clip having a simple, effective means of connection with the traveling cable. Another object is to provide a joint or hinge which will enable the clip to ride over its supporting sheaves.

BOTTLE-STOPPER.—James M. Schofield, Merced. No. 419,477. Dated Jan. 14, 1890. This invention relates to that class of bottle-stoppers which are more particularly applicable to bottles from which the regular corks have been removed during the period of use of the bottle. The object of the invention is to provide a simple and effective stopper of this class which is adapted to be readily inserted in the neck of the bottle and there confined, and is easily removed therefrom.

ORE-FEEDER.—Philip Hinkle, S. F. No. 420,424. Dated Jan. 28, 1890. Ore placed in the hopper will fill it, and a portion flows out through the mouth on to a swinging or

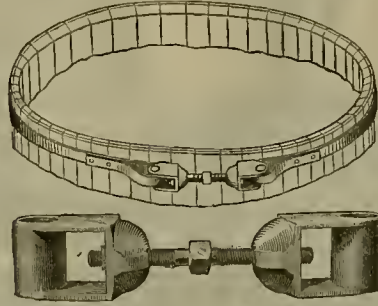
oscillating tray, and when by this oscillation it runs forward another portion of ore will move out on the tray. When the tray has again moved backward, a transverse bar prevents the ore moving backward and will force it forward over the edge and into the crusher or stamps. The movement of the tray is subject to regulation.

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Assessment Notices.

Gray Eagle Mining Company. Location of principal place of business, San Francisco, California. Location of Works, Placer Co., Cal.

NOTICE is hereby given that, at a meeting of the Board of Directors, held on the 21st day of January, 1890, an Assessment, No. 10, of Four (4) Cents per share was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin, to the Secretary, at the office of the Company, Room 11, No. 303 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the Twenty-fifth (25th) day of February, 1890, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 17th day of March, 1890, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
J. M. BUNTINGTON, Secretary,
Office, Room 11, No. 303 California St., San Francisco, California.

DIVIDEND NOTICE.

OFFICE OF THE PACIFIC BORAX, SALT & SODA COMPANY, San Francisco, January 31, 1890.—At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 28) of One Dollar (\$1.00) per share was declared, payable MONDAY, February 10, 1890, at the office of the Company, No. 230 Montgomery street, Rooms 11 and 12. Transfer Books close February 5, 1890, at 3 o'clock p. m.
ALTON H. CLOUGH, Secretary.

HORACE D. RANLETT,

Ores, Mining, and Commission,

420 Montgomery St., S. F.

Ships under advances to smelting works in Boston, New York, Baltimore and Liverpool.

Twenty-one years' experience in Shipping Ores and Managing Mines.

Solicits Consignments of Copper Produce and Management of Mining Matters.

All business conducted on Cash Basis.

Purchase and shipment of Mining Supplies a SPECIALTY.

Sales of Developed Copper Mines undertaken.

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FOR SALE.

One Ohmen's 12x12 Automatic Engine; best style in use. Also, 1 Boiler 48 in. x 16 ft. Both nearly new. Apply to J. W. QUICK, 221 First St., (Top Floor) San Francisco, Cal.

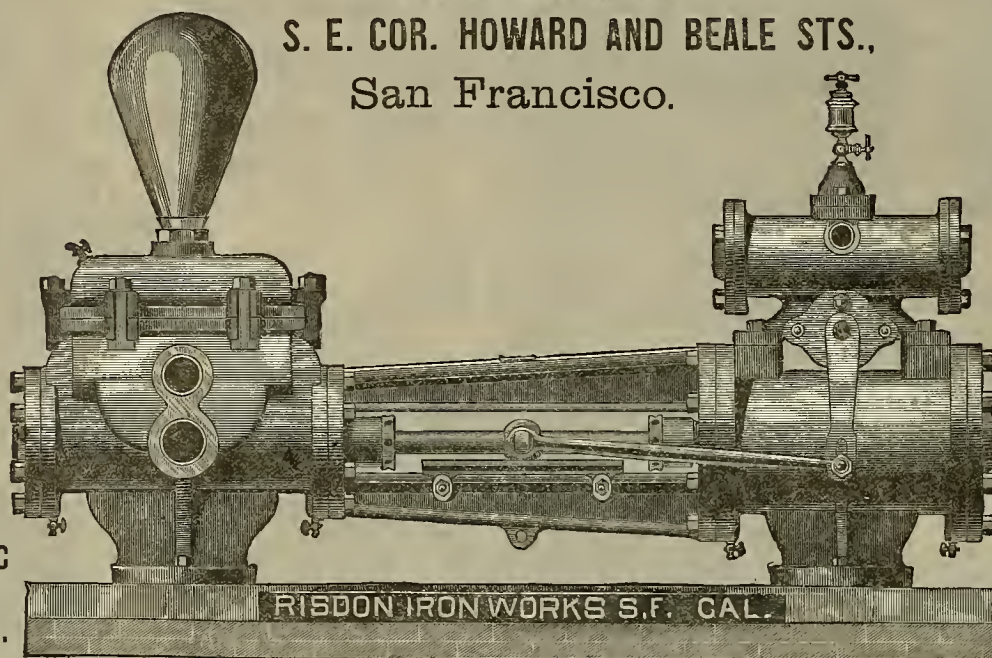
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—AND—
Heavy Pressure Valve.



Sugar House Pumps,
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Elevator Pumps,
Independent Air
Pump and Jet
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Artesian or Deep
Well Pumps.

The Only Steam Pump Made that can be run at High Piston Speed without Shock and with Safety to the Machine. Piston Rods, Stuffing-Boxes, Valve Seats, Stems and Linings of Water Cylinders are of Best Composition Metal, U. S. Standard.
EVERY PUMP THOROUGHLY TESTED BEFORE LEAVING FACTORY.

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108 and 112 First St., San Francisco, Cal.

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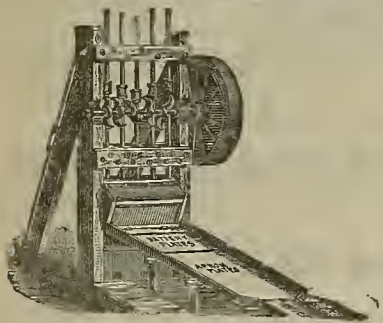
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BATTERY SCREENS AND WIRE CLOTH

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PRICES GREATLY REDUCED.

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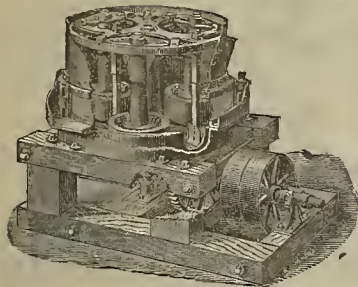
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CENTRIFUGAL ROLLER QUARTZ MILLS,

Concentrators and Ore Crushers,

Mining Machinery of Every Description. Steam Engines and Shingle Machines.

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Centrifugal Roller Quartz Mill.

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IMPROVED STEAM STAMPS

Holting Engines,
Safety Cages,
Safety Hooks,

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BUCKETS,

Air Compressors,
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Sectional Machinery
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Pumping Engines
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Pumping Machinery,

IMPROVED
WATER JACKET

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SLAG CARS AND POTS,
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Pressure Blowers,

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SOLE WESTERN AGENTS FOR TYLER WIRE WORKS DOUBLE ORIMPED MINING CLOTHS.

THE PELTON WATER WHEEL

GIVES THE HIGHEST EFFICIENCY OF ANY WHEEL IN THE WORLD.

OVER 800 ALREADY IN USE.

Affords the Most Simple and Reliable Power for all Mining and Manufacturing Machinery. Adapted to heads running from 20 up to 2,000 feet. From 12 to 20 per cent better results guaranteed than can be produced from any other Wheel in the Country.

ELECTRIC TRANSMISSION.

Power from these Wheels can be transmitted long distances with small loss, and is now extensively used in all parts of the country for generating both power and light.

APPLICATIONS

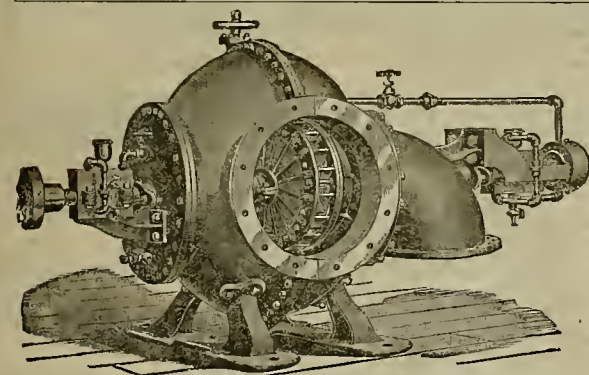
Should state amount, and head of water, power required, and for what purpose; with approximate length of pipe; also, whether the application is with reference to *Wheels* or *Motors* described below. SEND FOR CIRCULARS.

The Pelton Water Wheel Co.

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PELTON WATER MOTORS.

Varying from the fraction of 1 up to 15 and 20-horse power. Unequaled for all light-running machinery. Warranted to develop a given amount of power with one-half the water required by any other. SEND FOR MOTOR CIRCULAR. ADDRESS AS ABOVE.



JAMES LEFFEL'S Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing. Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case. Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Olobe Cases, free of cost, by applying to the manufacturers.

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SECOND-HAND BOILERS
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Hydraulic Mining Property in Southern Oregon. Good, Extensive. For particulars (Principals only) address, "A. M.," Box 77, Grants Pass, Oregon.

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COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

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SMELTING and LEAD CO.,**

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**GOLD AND SILVER REFINERY
And Assay Office.**

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

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**BLUESTONE,
LEAD PIPE,
SHEET LEAD,
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ALSO MANUFACTURERS OF
Standard Shot-Gun Cartridges,
Under Chamberlain Patent.

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We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Agents for the Morgan Crucible Co., Battersea, England. Also for E. G. Denniston's Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of silver guaranteed. Orders taken at his lowest prices. Our Illustrated Catalogue and Assay Tables sent free on application.

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Near First and Market Streets, S. F.

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ESTABLISHED 1869

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

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GREAT REDUCTION!

BATTERY SCREENS.

Best and Cheapest in America.

No imitation, no deception, no planished or rotten iron used. Only genuine Russia Iron in Quartz Screens. Planished Iron screens at nearly half my former rates. I have a large supply of Battery Screens on hand suitable for the Huntington and all Stamp Mills, which I will sell at 20 per cent discount.



PERFORATED SHEET METAL

For Flour and Rice Mills, Grain Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Iron, Steel, Copper, Brass. Zinc and other metals punched for all uses.

Inventor and Manufacturer of the celebrated Slot Cut or hurred and Slot Punched Screens.

Mining Screens a specialty, from No. 1 to 15 (fine).

Orders promptly attended to.

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JOHN W. QUICK, Proprietor.

WINCHESTER HOUSE,

44 Third Street, - San Francisco, Cal.

This Fire-proof Brick Building is centrally located, in the healthiest part of the city, only a half block from the Grand and Palace Hotels, and close to all Steamboat and Railroad Offices.

Laundry Free for the use of Families.

HOT AND COLD BATHS FREE.

Terms, Board and Room, \$1.00 per Day

And Upward.

Rooms with or without Board.

Free Coach to the House.

J. POOLEY.

MARKET REPORTS.

Local Markets.

SAN FRANCISCO, Feb. 6, 1890.

With generally fair weather in this State the past week, trade shows a decided increase, with the volume of goods going out on orders larger than at any time within the past two months. It now looks as if merchants' expectation of a liberal trade this spring will be more than realized. Manufacturers look forward with a certainty that they will have a more prosperous season this year than has been enjoyed for several years; this applies more particularly to foundrymen, machinists and iron-workers in general.

The money market continues to grow easier, and now with general trade and inland transportation resumed, much more ease is looked for before the month passes. There are now no idle men, unless from choice, as the call for day laborers has well cleaned up the supply. Dividends disbursed in this city in last month compare as follows with the disbursements in January, 1889:

	1889.	1890.
Banks.....	\$522,000	\$562,256
Cas companies.....	74,500	68,250
Water companies.....	62,500	19,500
Insurance companies.....	84,000	67,000
Street railroad companies.....	25,000	12,500
Powder companies.....	27,000	37,500
Sugar companies.....	36,000	80,000
Mining companies.....	259,250	219,500
Miscellaneous companies.....	81,250	40,250
Totals.....	\$1,120,000	\$1,107,055

In addition, the savings banks of the city disbursed in cash or credits to depositors and stockholders about \$1,400,000 last month. The interest disbursements by incorporated companies, cities, counties and State were unusually heavy in last month.

S. H. Brooks, Assistant Treasurer United States at San Francisco, reports cash on hand Jan. 31, 1890, as follows:

United States notes.....	\$ 66,438 00
National bank notes.....	5,235 00
Gold certificates.....	2,040 00
Redeemed gold certificates (Series 1888).....	100,000 00
Silver certificates.....	112,000 00
Gold coin.....	40,950,400 00
Standard silver dollars.....	18,237,141 00
Fractional silver.....	6,403,793 80
Minor coin.....	6,743 14
Total.....	\$65,914,390 94

The shipments of silver from the Sub-Treasury into the interior of the State and elsewhere for the month were as follows:

Standard dollars.....	\$75,650
Fractional silver.....	14,105
Total.....	\$89,755

MEXICAN DOLLARS—The market continues dull under light buying. The only export buyers in the market for the steamer that sailed on Tuesday for China were Chinamen, and they only shipped \$70,245. The market has ruled weak at 75½¢/76 cts., closing 76½¢/76 cts. to-day.

SILVER—The market has been dull throughout the week, in the absence of export buyers and light receipts of bullions. Now that the snow-blockades are raised, receipts are expected to increase. The silver market continues weak the world over; doubtless this is largely due to the statement of Senator Teller, a strong bimetalist, that President Harrison will veto any bill for the free coinage of silver, and also that the bimetalists in Congress are opposed to the Administration (Secretary Windom's) bill, or to any bill not giving full recognition of silver by which it will be placed on a par with gold. The impression appears to be, judging from our leading Eastern exchanges, that there will not be any favorable legislation at this session of Congress. The latest silver bill introduced is that by Senator Cockrell, on January 27th, amending the Act of Feb. 23, 1876, and authorizing Secretary of the Treasury to purchase silver bullion at the market price thereof not less than \$5,000,000 worth per month, to be coined monthly, as fast as purchased, into standard silver dollars. The bill provides that when the Secretary of the Treasury cannot purchase such silver bullion at a market price less than 99 cents for 412½ grains of such silver bullion of standard fineness, that such bullion shall be received and disposed of in like manner as gold bullion. The bill repeals all laws authorizing the issue of gold certificates and silver certificates upon the deposit of gold coin or standard silver dollars, and authorizes the Secretary of the Treasury, upon the deposit with the treasurer or any superintendent of mints, by any holder of gold coin or bullion or standard silver dollars, when the market price of such silver bullion is not less than 99 cents for 412½ grains, to issue therefor in the denominations now authorized coin certificates. The bill also authorizes the Secretary of the Treasury to cancel and destroy all existing gold and silver certificates as fast as they are received by the Treasurer, and to issue in lieu coin certificates of like denomination for the gold and silver certificates so received.

Confirmed reports were received by the last arrived steamer from Hongkong that the Chinese Government is formulating a plan for coining silver. In the local market the only buyer the past week has been the Mint. The price paid was 97½ cents up to February 3d, when it was dropped a quarter of a cent; that was followed by another drop of a quarter of a cent on to-day (Thursday). Very little bullion is offering for sale. The Carson Mint takes about all that is turned out by the Comstock mines.

QUICKSILVER—Receipts the past week aggregate 62 flasks, and the exports by sea 41 flasks to Mexico. Continued bad roads are against shipments from the mines. The market holds strong at all figures.

COPPER—The Eastern market fluctuated to lower prices, but at the close it appears to be steady. The decline was largely due to foreign advices that buyers having their wants met by deliveries from previous contracts were not operating, and consequently any forced sales were met by lower bids. In their January circular, James Lewis & Sons, London, say: "The stocks continue steadily to decrease, both those of which returns are made in England and France and also those held in France and in the United States in private warehouses by the bankers who took them over from the late syndicate. About 9000 tons have been sold by these bankers during the past month, including 3000 tons

of lake ingots lying in New York at 14 cents per pound, or 66¢ 10s. per ton, with 2½¢ per cent discount. We therefore now consider that in the nine months which have passed since the collapse of the French syndicate, the stock then held on their account has been reduced from 179,000 tons to about 110,000 tons, the reduction in the public stocks being 25,000 tons, or from 118,000 tons to 93,000 tons, and in the "invisible" stocks 44,000 tons, or from 61,000 tons to 17,000 tons.

A Franco-English syndicate has been formed to work the Torre de Capdella copper mine. It is said to be one of the best mines in Spain.

LEAD—The market has been essentially unchanged.

TIN—The exports by sea the past week aggregate 108,000 lbs. of plate to Victoria, B. C. The market for spot continues heavy. For shipment no business can be done, owing to our market being below English parity. The foreign market shows considerable activity, with about all the weak holdings cared for. The demand from the United States is reported as being light.

BORAX—Receipts the past week aggregate 250 cts., and exports by sea 22,621 lbs. to New York and 100 pounds to Mexico. The market is reported firm in sympathy with the East.

LIME—Receipts the past week aggregate 1000 bls., and exports the past week 700 bls. to Honolulu. Owing to fair weather the local demand begins to show signs of increasing.

ANTIMONY—Eastern mail advices report lower prices and a weaker market due to freer importations.

IRON—The pig-iron market is quiet but firm, owing to prices being below the parity of the primary markets. A leading New York paper says that President Clark of the Thomas Iron Company is as bullish as ever, and he says the company could have sold twice its products for the year 1890 to its regular customers and to an English syndicate. An English house offered \$20 per ton for every ton of iron the Thomas Iron Co. could produce this year, and to pay cash monthly whether they took the iron or not. Mr. Clark refused, and has sold 170,000 tons at \$18, \$19 and \$20, and says he would not sell a pound now under \$2 advance on these prices. The odd fact this year is the big demand for No. 2 iron. "You can say that the Thomas Iron Company is out of the market for all grades of iron for the year 1890." In the last six months the company sold more iron than it ever did, and made more money.

Foreign advices report Glasgow merchants bearing the market so as to fill their contracts at lower prices, which causes consumers to fight shy of the market; but, on the other hand, that some South Wales capitalists have combined to keep the market up, if not advance still higher, so as to unload their large holdings at a profit.

COAL—Imports the past week aggregate as follows: Newcastle, N. S. W., 1738 tons; Nanaimo, 2515; Comox, 4300; Departure Bay, 1250; total, 5803 tons. The market is being well cleaned up of English coals, and as there are now some of the brands on the way, quotations will probably be dropped soon. The tonnage on the way from Newcastle, N. S. W., continues to grow beautifully less. The prices for Australian for shipment precludes business. The spot market for all grades is reported unchanged, last week's report covering the situation this week.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, February 6, 1890.

ANTIMONY—Refined, in carload lots.....	25 @	79
Powdered.....	7 @	—
Concentrated.....	7 @	—
All grades jobbing at an advance.....	62 @	—
COPPER —		
Sheet.....	21 @	22
Sheathing.....	22 @	24
Ingot, jobbing.....	17 @	18
do, wholesale.....	15 @	16
Pure Box Sheets.....	22 @	24
LEAD —		
Pig.....	4 @	42
Sheet.....	7 @	—
Pipe.....	6 @	—
Spot, discount 10% on 500 bags Drop, per bag.....	1 45 @	—
Butt, per bag.....	1 35 @	—
Chilled, do.....	1 35 @	—
TIN —		
B. V., steel grade, 14x20, to arrive.....	4 50 @	4 85
B. V., steel grade, 14x20, spot.....	4 70 @	4 75
Charcoal, 14x20.....	6 75 @	7 00
do, roofing, 14x20.....	6 00 @	—
do, do, 20x28.....	12 @	—
Pig tin, spot, per lb.....	21 @	22
CORE —		
Eng. ton, spot, in blk.....	13 50 @	15 00
do, do, to load.....	15 00 @	—
QUICKSILVER —		
By the flask.....	30 00 @	—
Flasks, new.....	50 @	—
Flasks, old.....	35 @	—
CHROME IRON ORE , per ton.....	10 20 @	—
IRON—		
Bar, base.....	3 @	23
Norway, base.....	4 @	24
STEEL —English, lb.....	16 @	20
Canon tool.....	9 @	9
Black Diamond tool.....	9 @	9
Do, do, to load.....	8 @	10
Do, do, to load.....	8 @	10
Machinery.....	4 @	5
Toe Calk.....	4 @	5
SPOT FROM YARD.		
IRON—Glasgow ton.....	35 @	—
Exglinton, ton.....	35 @	—
American Pig, No. 1, ton.....	32 @	—
Oregon ton.....	32 @	—
Puget Sound.....	35 @	—
Clay Lane White.....	42 @	—
Scott's Splint, No. 1, ton.....	35 @	—
Bar Iron (base price) per lb.....	35 @	—
Langdon.....	35 @	—
Thorncliffe.....	35 @	—
Garsheirie.....	35 @	—

Coal.

	TO LOAD.			
	Per Ton.			Per Ton.
Australian	7 50 @	7 75	Leibigh Lump..	16 50 @ 17 00
Liverpool S'm	8 50 @	—	Cumberland bk	16 00 @ —
Scotch Splint.	9 00 @	9 00	Egg, bard....	15 50 @ —
Cardiff	9 50 @	10 00		
SPOT FROM YARD.				
Wellington	\$ 9 00	Seattle.....	7 00	
Scotch Splint	9 00	Coos Bay.....	6 00	
Greta	8 00	Cannell.....	12 00	
Westminster Bymbo.	9 00	Egg, bard . . .	12 00	
Nanaimo	9 00	Cumberland, in sacks	16 00	
Sydney	8 00	do, bulk.....	14 00	
Gilman	7 00			

A PACIFIC COAST AGENCY for the McNeil Pipe and Foundry Co. of Burlington, New Jersey, has been established in this city. Mr. B. A. Knight is manager, with office in room 4, No. 308 Market street.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	No. AMT. LEVIED.	DELINQ'T.	SALR.	SECRETARY.	PLACE OF BUSINESS.
Adelaide Copper M Co.....	Nevada.....	1.	Dec 31.	Feb 17.	Mar 17.	W H Graves..... 426 Sansome St
Baldwin M Co.....	Nevada.....	2.	Jan 1.	Feb 17.	Mar 17.	A K Grinn..... 402 Montgomery St
Camp Creek M & M Co.....	California.....	1.	Dec 30.	Feb 12.	Mar 12.	A S Folger..... 213 Fremont St
Con St Gothard M Co.....	California.....	1.	Jan 14.	Feb 17.	Mar 17.	T Wetzel..... 522 Montgomery St
Crocker M Co.....	Arizona.....	8.	Jan 10.	Mar 5.	Mar 28.	N T Messer..... 309 Montgomery St
Excelsior M Co.....	Arizona.....	23.	Dec 16.	Feb 10.	Mar 3.	O E Elliott..... 309 Montgomery St
Golden Giant M Co.....	California.....	1.	Dec 17.	Jan 23.	Feb 12.	H T Briggs..... 309 Montgomery St
Grand Prize M Co.....	Nevada.....	24.	Jan 27.	Mar 5.	Mar 28.	R R Grason..... 327 Pine St
Gray Eagle M Co.....	California.....	16.	Jan 4.	Jan 27.	Mar 17.	J M Buntington..... 303 California St
Mayflower Gravel M Co.....	California.....	45.	Dec 27.	Feb 3.	Feb 25.	J Morizo..... 328 Montgomery St
Mexican M Co.....	Nevada.....	33.	Dec 21.	Feb 6.	Feb 27.	O E Elliott..... 309 Montgomery St
Mineral King M & M Co.....	Arizona.....	4.	Jan 10.	Jan 10.	Mar 3.	P H Leonard..... 309 Montgomery St
Natoma Water & M Co.....	California.....	2.	Dec 21.	Jan 23.	Feb 25.	P W Ames..... 510 California St
Occidental Cons M Co.....	Nevada.....	25.	Jan 20.	Feb 25.	Mar 24.	A K Dunbar..... 309 Montgomery St
Orman S M Co.....	Nevada.....	61.	Dec 21.	Jan 5.	Feb 25.	G D Edwards..... 414 California St
Russell R & M Co.....	California.....	6.	Jan 13.	Feb 17.	Mar 12.	J Morizo..... 323 Montgomery St
Seg Belcher & Mides M Co.....	Nevada.....	5.	Jan 25.	Feb 6.	Feb 25.	E B Holmes..... 309 Montgomery St
Silver King M Co.....	Arizona.....	20.	Jan 15.	Feb 25.	Mar 27.	A Waterman..... 309 Montgomery St
Telroak M Co.....	California.....	3.	Dec 14.	Jan 21.	Feb 14.	J W Garrett..... 308 Pine St
True Cons M Co.....	California.....	3.	Jan 18.	Feb 15.	Mar 10.	J C Bates..... 434 California St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Alabama, Humboldt & Bailey M Co.....	.....	W H Watson.....	302 Mo ntgomery St.....	Annual.....	Feb 10
Bechtel Cons M Co.....	California.....	C F Griffin.....	303 California St.....	Annual.....	Feb 10
Holmes M Co.....	.....	Nevada.....	C E Elliott.....	Annual.....	Feb 11
Lucky Hill Cons M Co.....	.....	F D Black.....	Baldwin Hotel.....	Annual.....	Feb 13
Natoma W & M Co.....	California.....	P W Ames.....	.....	Annual.....	Feb 11
Standard Cons M Co.....	California.....	J W Pew.....	310 Pine St.....	Annual.....	Feb 17
Sunderbas G M Co.....	California.....	H T Crosswell.....	504 Kearny St.....	Annual.....	Feb 11
Watt Blue Gravel M Co.....	California.....	G A Bertou.....	313 Montgomery St.....	Annual.....	Feb 17

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Champion M Co.....	Nevada.....	T Wetzel.....	522 Montgomery St.....	03.....	Jan 30
Caledonia M Co.....	Nevada.....	A S Obeniant.....	328 Montgomery St.....	03.....	Aug 5
Con California & Va M Co.....	Nevada.....	A W Havens.....	309 Montgomery St.....	25.....	Jan 10
Derbec Blue Gravel M Co.....	California.....	T Wetzel.....	522 Montgomery St.....	10.....	Dec 23
Globe M Co.....	California.....	H T Crosswell.....	309 Montgomery St.....	50.....	Nov 7
Mt Diablo M Co.....	Nevada.....	R Heath.....	313 Montgomery St.....	100.....	Oct 2
Pacific Borax Salt & Soda Co.....	California.....	A H Clough.....	230 Montgomery St.....	100.....	Feb 10

Eastern Metal Markets.

By Telegraph.

NEW YORK, Feb. 6, 1890.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday.....	44 1/2	97 1/2	\$14 55	\$3 82 1/2	\$21 10
Friday.....	44 1/2	97 1/2	14 25	3 82 1/2	21 20
Saturday.....	44 1/2	97 1/2	14 25	3 82 1/2	21 36
Sunday.....	44 1/2	97 1/2	14 15	3 82 1/2	21 15
Tuesday.....	44 1/2	97 1/2	14 15	3 82 1/2	20 80
Wednesday.....	44 5/16	96 1/2	14 20	3 82 1/2	20 80

NEW YORK, Feb. 6.—Refined California borax, \$5@9c; steady. Quicksilver—Nominally \$8@70c. Limited sales of ingot copper. The large consumer seem well stocked and disinclined to buy ahead. Speculative interest extremely tame. Mining companies offer indifferently. Quoted prices, 14¢ for lake ingot, 13¢ for common casting. Outside lots could be secured for a shade less. London cables again lower; merchant bars, 24 1/2 1/8. P. D. spot; 250 lbs for futures. Pig lead very quiet, and is without a new feature of any kind. About \$3.85 is the general price for prompt and near future deliveries.

Mining Share Market.

The remarkable strength exhibited by the Comstock shares throughout the month of January has been a source of fruitful remarks from outsiders who have been led to believe that lower prices must obtain. The very close money market has kept a large class of outsiders from buying, while the hard times compelled many having stocks paid for to sell either part or all, and yet the market absorbed every share sold without going lower. The suspension of work in about all the mines on the Comstock, particularly in the Gold Hill group of mines, from Jan. 17th to Feb. 4th had its unfavorable influence on the market. Now that the weather has moderated in Virginia City and the railroads have commenced running, work in the mines has been resumed, with ore being extracted from the bullion-producers. Inside producers are put out for lower prices, claiming that Col. Mackay and Commodore Flood are so loaded up with stocks that they are unable, for the want of money, to make a deal. When stocks were up a year ago the points then were that Col. Mackay and Commodore Flood were selling short on everything along the line, and that ex-United States Senator Fair and General Alvinza Hayward were buying so as to corner them, and the advice was to hold your stock, for "Uncle Jimmy" would make them smell sulphur. Now that stocks are down, do not buy, for Colonel and Commodore will have to unload, when down goes the market as badly as George Miller, the stockbroker, went with his wife while out huggy-riding. In outside stocks the Tuscaroras, to keep up with the times, were nearly snowed under by the bears. A report is now current that Commonwealth will pay a dividend in next month, so as to offset the assessments that will have to be levied. The Quijotas and Bodie were very quiet at black-board prices. The report is still current that Bodie is to be assessed soon.

From the mines private news is still scarce, due to work during the recent heavy snowstorms having been suspended in the more promising mines on the Comstocks. Official letters received to-day (Thursday) report that work has been resumed, and that in both the Alpha and Con Imperial north drifts they are in ore, which, in the former mine, shows an improvement, from Overman, Seg. Belcher, Crown Point and Belcher our advices are of a more flattering character, as are our advices from Hale and Norcross. The grade of ore in the latter mine continues to improve. Taking our advices as a whole, they are more favorable than have been received for several months past. From the Tuscaroras reliable advices are slightly more favorable, yet hardly enough to deserve special mention. The Quijotas continue to send along good news, which is directly opposite from the action of the stocks. Official letters from the Bodie are of the same stale, barren character they have been for a long time past, but reliable private advices are of a more hopeful character, as the work of the mines progresses. In Bodie several levels are being opened up for more active prospecting work, which will be carried on under the supervision of Acting Superintendent John W. Kelly. Experienced mining men in Bodie do not now appear to be discouraged and speak very hopefully of the future. What they ground their faith on our correspondent does not say, but intimates that it is the favorable work going on in one or two of the mines.

THE Technological Society of the Pacific Coast will meet at its rooms, 408 California street, on Friday, February 14th, to hear a paper by Rose E. Browne and H. C. Behr on "Dr. Pohl's Air-Lift Pump."

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Jan. 15.	WEEK ENDING Jan. 23.	WEEK ENDING Jan. 30.	WEEK ENDING Feb. 6.
Alpha.....	.90	.95	1.05	.90
Alta.....	1.20	1.25	1.30	1.25
Andes.....	.50	.60	.50	.45
Belcher.....	1.70	1.85	1.95	1.75
Best & Belcher.....	2.25	2.35	2.40	2.50
Bullion.....	.55	.65	.60	.65
Bodie Con.....	.40	.45	.60	.45
Bulwer.....	.30	.20	.20	.20
Commonwealth.....	3.40	3.55	3.50	3.65
Con. Va. & Cal.....	4.10	4.40	4.75	4.80
Challenge.....	1.10	1.25	1.35	1.40
Chollar.....	2.20	2.25	2.30	2.45
Confidence.....	3.25	.30	.35	3.40
Con Imperial.....	.25	.30	.35	.30
Caledonia.....	.15	.15	.15	.20
Crown Point.....	1.50	1.55	1.70	1.65
Crocker.....	.20	.25	.25	.25
Eureka Con.....	.15	.25	.45	.40
Excelsior.....	.55	.65	.60	.55
Grand Prize.....	.45	.75	.50	.65
Gould & Curry.....	1.30	1.40	1.35	1.40
Hale & Norcross.....	2.10	2.15	2.20	2.25
Julia.....	.25	.30	.30	.25
Justice.....	1.15	1.30	1.30	1.30
Kentuck.....	.35	.70	.60	.65
Lady Wash.....	.30	.30	.30	.30
Mono.....	.25	.35	.40	.35
Mexican.....	2.10	.20	2.60	2.75
Monterey.....	.55	.65	.70	.65
North Belle Isle.....	1.05	1.25	.10	.35
Nev. Queen.....	.25	.90	.90	.95
Occidental.....	.50	.65	.75	.60
Opbir.....	3.65	3.40	3.70	3.50
Placer.....	1.90	1.95	2.10	2.00
Potosi.....	1.60	1.75	1.75	1.70
Peelers.....	.25	.35	.20	.25
Petr.....	.15	.15	.20	.20
Savage.....	1.40	1.55	1.55	1.65
Sierra Nevada.....	1.90	1.95	2.10	2.00
Sierra Nevada.....	1.80	1.55	2.05	2.00
Silver Hill.....	.25	.35	.30	.35
Scorpion.....	.15	.15	.15	.15
Union Con.....	2.55	2.20	2.55	2.35
Utah.....	.60	.60	.55	.60
Yellow Jacket.....	1.70	1.95	2.55	2.00

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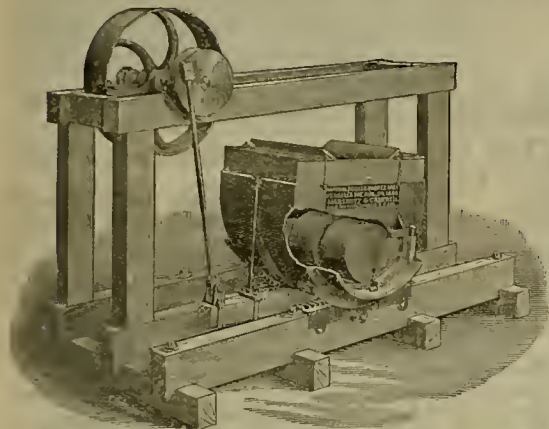
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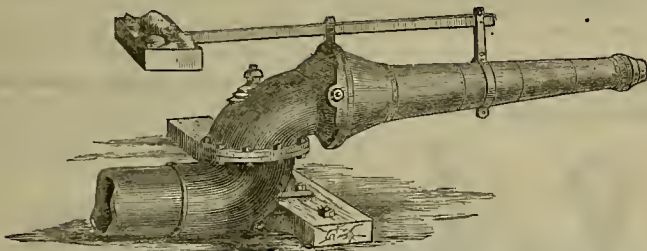
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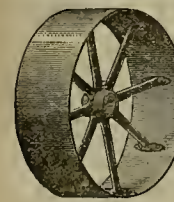
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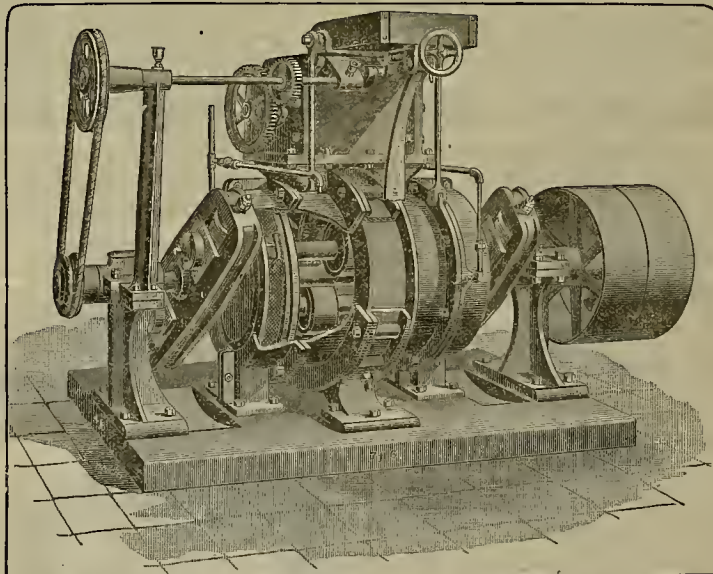
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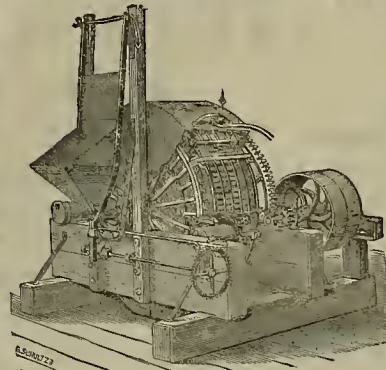
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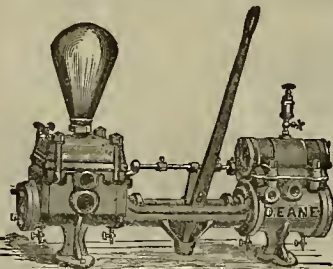
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COAL MINES OF THE WESTERN COAST.

A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

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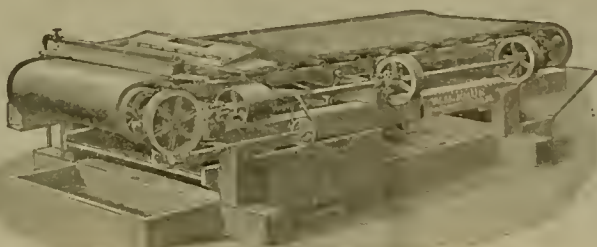
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Protected by Patents December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883; July 24, 1888. Patents applied for.

There are Over 2200 Plain Belt Machines now in Use.

THE MONTANA COMPANY (Limited), London, October 8, 1888.
DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly, THE MONTANA COMPANY (Limited).

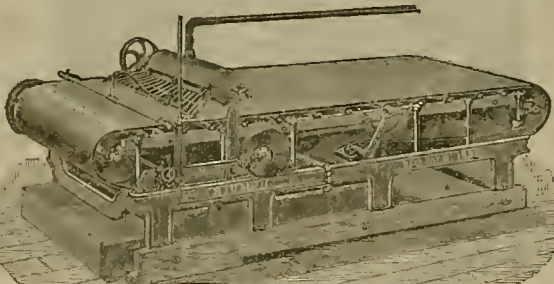
N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

"TRIUMPH" ORE CONCENTRATOR WITH IMPROVED RIFFLED BELT.

The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frue" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frue" Vanner is the best ore concentrator in the market. Tho fact that the "Frues" have improved (corrugated) belts does not militate against the superiority of the "Triumphs;" for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.

Price "Triumph" Concentrators, with Improved (Patented) Belt - - - \$650 f. o. b.
Price "Triumph" Concentrators, with Plain Belt - - - - - \$550 f. o. b.

We are prepared to guarantee the superiority of the "Triumph" over the "Frue" or any other form of Concentrator, for coin if need be. Circulars and testimonial letters furnished on application.



(PATENTED.)
Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

Original Empire Mill and Mining Company,
Principal Office, 401 California St., cor. Sansome, S. F.
Location of Works, Grass Valley, Nevada Co., Cal. }

GRASS VALLEY, NEVADA CO., CAL., Nov. 10, 1888.

Joshua Hendy Machine Works, 39 to 51 Fremont St., S. F., Cal.:
GENTLEMEN—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.

At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrators is the equal, if not superior to any other style of Vanners or concentrating devices. DAVID McKAY, JR.,
[Signed] Sup't North Star and Original Empire Mining Co.

N. B. When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.

JOSHUA HENDY MACHINE WORKS,
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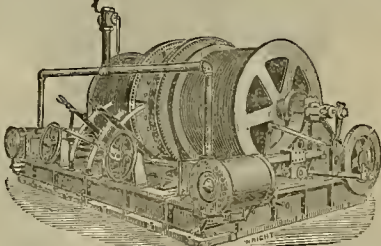
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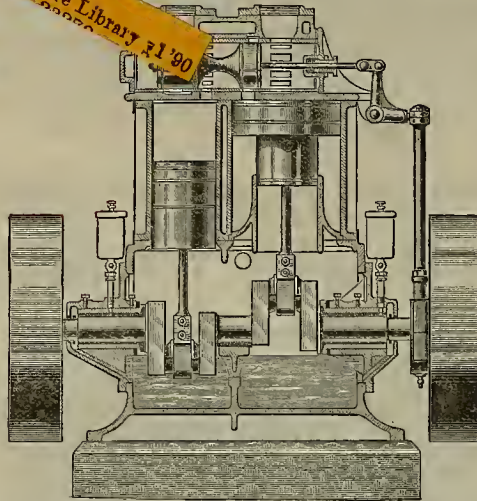
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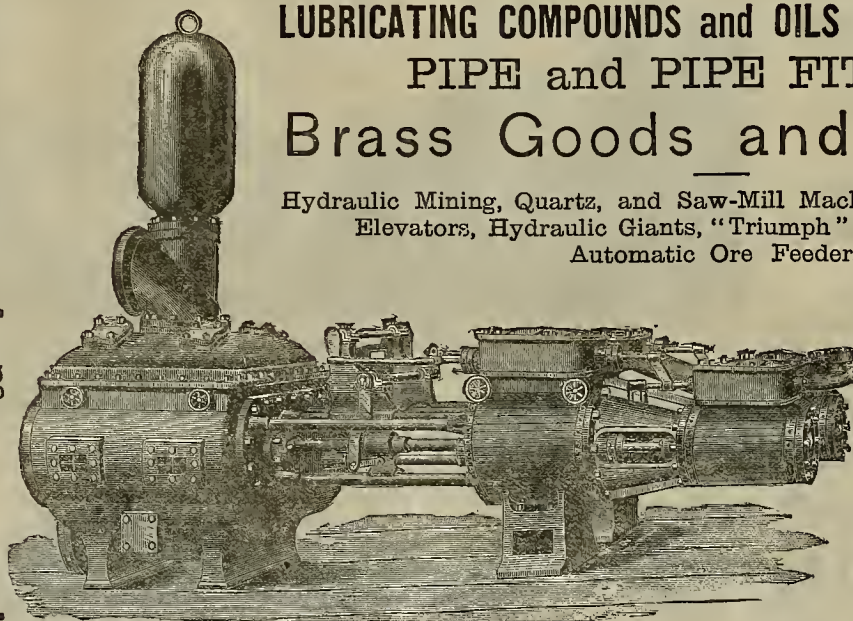
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MINING AND SCIENTIFIC PRESS

An Illustrated Journal of Mining, Popular Science and General News.

VOL. LX.—Number 7.
DEWEY & CO., PUBLISHERS.

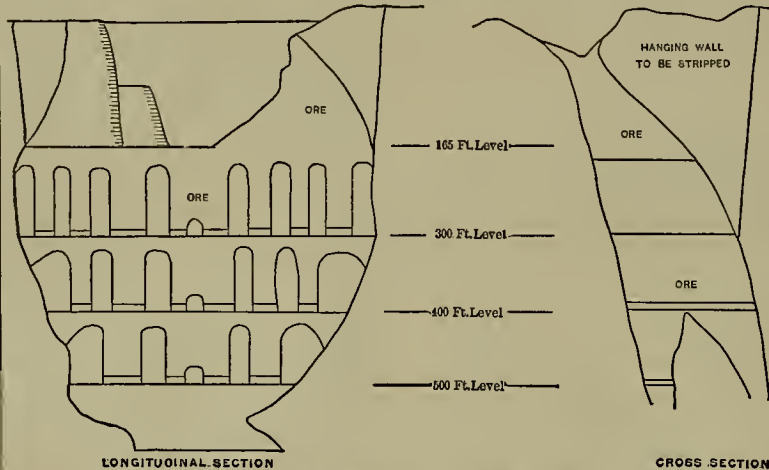
SAN FRANCISCO, SATURDAY, FEBRUARY 15, 1890.

Three Dollars per Annum.
Single Copies, 10 Cts.

The Fulton Rock-Breaker.

A patent was secured this week through the MINING AND SCIENTIFIC PRESS Patent Agency for the Fulton rock-breaker, which embraces several new and valuable improvements in this class of mining machinery. The old form and principle of the Blake machine, of a central oscillating pitman, transmitting its motion to the moving jaw through toggle jointed plates, is retained, and in the Fulton rock-breaker the Blake movement will be found proportioned and applied in the best form called for by practice. The Fulton Iron Works of this city claim no improvement on the Blake principle, but have endeavored in designing their new machines to render the wearing parts more accessible and easier renewed, and also to make such improvements in the manufacture as increase the wearing qualities.

Fig. 1 of the engravings shows the rock-breaker with stationary jaw closed and ready for work. Fig. 2 shows the jaw open to allow



of the die, and holding it firmly in place when side bars are tightened. It will be seen from this that no bolts are required for holding the die in place; and consequently new bolts of a special pattern have not to be provided every time a new die is put on the jaw; and when the jaw is lowered it is only necessary to slip off the old die, replace it with a new one and swing back into position. The cheek-plates can also be easily renewed when the stationary jaw is lowered; and the movable jaw can be swung entirely clear of the frame and a new shoe fitted to it without taking its supporting shaft out of its bearings.

The section of the upper part of pitman in Fig. 3 shows a simple and effective device for preventing the pounding and consequent heating of this important bearing when the eccentric shaft has worn out of round, due to the strain upon it being constantly in one direction. A spring is placed beneath the loose habbitt-lined gih bearing against the lower part of the shaft; the tension of the spring, and consequent-

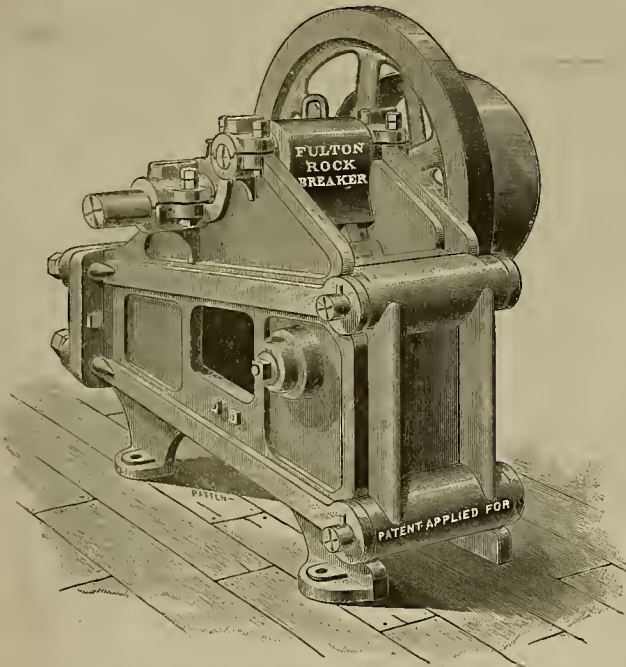


Fig. 1.—FULTON ROCK-BREAKER READY FOR WORK.

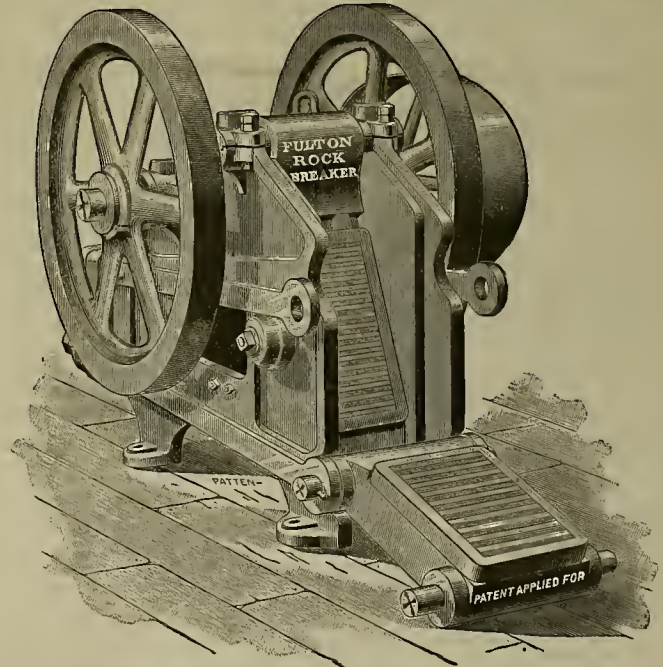


Fig. 2.—ROCK-BREAKER WITH JAWS OPEN.

easy renewal of the shoe, die and cheek-plates when they become worn. Fig. 3 is a sectional view taken through the center. The numbers on the latter cut refer to parts which it is unnecessary to detail here.

As will be seen, the stationary jaw is rigidly held in place in Fig. 1 by means of flat iron bars having eyes forged on their ends, slipping over shafts in top and bottom of the jaw. By taking out the pins in the ends of the upper shaft and loosening the nuts holding them in tension at back of rock-breaker, the upper bars can be slipped off and the jaw pivoting on the lower shaft can be opened and lowered as shown in Fig. 2. The die, when jaw is closed as in Fig. 1, is held in place by its edges abutting and being tightly held against the cheek or wearing plates on the inside of the rock-breaker. These cheek-plates have strong hubs cast upon their sides which fit into corresponding holes in the side frames, thus allowing them to accommodate themselves to the edges

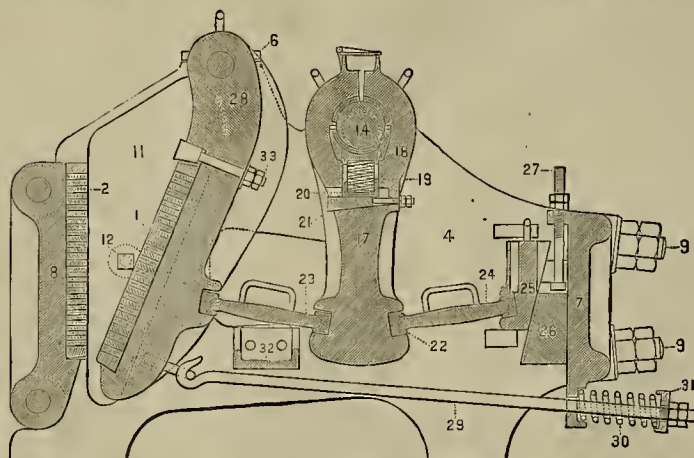


Fig. 3.—SECTIONAL VIEW OF FULTON ROCK-BREAKER

ly its pressure against the gih, is regulated by a wedge placed beneath and adjusted by means of nuts on outside of pitman. In this way all lost motion is taken up and both pounding and heating prevented.

A fair idea of the construction of the shoe and die may be obtained from Figs. 2 and 3. They are composed of alternate layers of wrought iron and hardened machine-steel bars placed on edge and held together by a heavy wrought iron band shrunk around them. The iron being softer than the steel, wears away more rapidly, causing the shoe and die in a short time to present a corrugated surface to the rock and giving a better crushing effect. The surfaces of the iron bars do not wear but a short distance below those of the steel, being then protected by them, and obliging the hardened steel to do most of the work, which it is far better calculated to stand. There is no danger of the bars becoming loose and falling

(Continued on page 119.)

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

The Golden City Mining Company.

EDITORS PRESS:—Being largely interested in the mining industry of this State, and particularly in connection with the Golden City Mining Co., of which I am Secretary and a member of the Board of Directors, I should like to have all those who are interested in these and similar industries know what our prospects are.

The company was incorporated on the 23d of July, 1889, under the general laws of the State of Oregon relating to private corporations, with a capital stock of \$1,000,000, divided into 1,000,000 shares. For certain reasons those interested in the mines to develop which this company was incorporated, the directors on the 30th of November, 1889, filed supplemental articles of incorporation increasing the capital stock of the company to \$3,000,000, divided into as many shares.

The stock of the company is now assessable, and the directors have ordered that the stock be sold at the market price, which at the present is ten cents per share, and a sufficient amount thereof be disposed of to put in the necessary machinery to develop and operate the mines to a paying basis.

There is no difficulty in disposing of stock on the aforesaid terms, and we feel confident that with the sale of a half-million shares we can put in such machinery as shall be required.

The company own 11 large gold and silver-bearing quartz ledges, all of which are situated within a radius of two miles and about 60 miles from Albany, the route from here being over the Oregon Pacific Railway to Gatsville, or Rock Creek, the latter being the name of the postoffice at that point, and thence by trail 20 miles to the mine, in the old Sentim or Quartzville district.

Some years since there was a good wagon-road into the mountains to this mining district, but years of disuse and fallen timber have rendered it impassable except with pack-horses, though the writer is informed that last fall the road to within three miles of Quartzville was passable for wagons.

When spring opens a good wagon-road will be opened and rendered passable, so that the mines in this district will be easily accessible. The mines of the company have been prospected for the past year, and assays from the ore taken therefrom disclose high-grade milling ore, which varies in richness from \$4 to \$400 per ton in gold, and with traces of silver. From the accessibility of mines, the size of ledges and the ease with which the ore can be worked, we may, without presumption, predict that these mines will in a very short while be considered desirable properties.

Albany, Oregon. L. H. MONTANYE.

A Big Gold Ledge.

EDITORS PRESS:—The Grunter mine is situated at Shoup, Lemhi Co., Idaho, on the Salmon river, and a short description may be of interest to mining men and capitalists, and perhaps benefit some one now or in the near future. This mine is owned by original locators. The country rock here is principally granite, with two large dykes running at right angles to each other and plainly traceable for miles; one is bird's-eye porphyry and the other blue eyenite. The latter has a southwest course, and forms the hanging-wall of the vein. The ore crops out about 300 feet above the river, and dips south at an angle of 75 degrees with the hill and toward the river, which makes it easy to develop. There are open cuts run at short intervals along the croppings for 600 feet, which show some very fine honey-combed and sulphureous ore; then they come down the hill 75 feet and run an adit across the vein 50 feet, which is made up of hard white quartz and ledge matter carrying from 3 to 15 per cent sulphureous, and assays as it comes out of the vein from \$10 to \$50 per ton in gold. The best streak is on the hanging side, and is about 10 feet thick; there is a drift run east and west on this streak about 100 feet each way, and at the face of the west drift there is a raise put up to the surface, which shows some high-grade ore and a well-defined wall throughout.

The next adit or tunnel is 180 feet lower down the hill and runs through about 75 feet of surface and eyenite before coming to the vein; then they drove a short drift west, which shows the ore to have the same true course and pitch as in the level above; but the good quartz is divided into smaller seams. From the hanging-wall to the present face of the tunnel, which is driven directly at right angles with the course of the vein, it is just 200 feet, the whole mass of which is a highly mineralized vein matter that will average about three per cent sulphureous. There are also five or six seams of clean quartz and iron at intervals along the tunnel, that vary from a few inches up to 4½ feet in thickness, and assay from \$10 to \$200 per ton. The smallest assay taken from drill-holes a few feet apart along the side of this tunnel gave \$4 per ton, and the face assays \$10. I think the whole business would average \$6, and it is safe to say that there is 500,000 tons in eight, although it is not actually blocked out by drifts and ore-cuts. The fact

that there is a short tunnel run into it 300 feet east of this one, and a deep gulch 400 feet west of here, which cuts the lead and exposes a big bluff of it to view, suggests a vast deal more.

There is also a mine 2000 feet farther west on this contact developed to a depth of 800 feet. The present owners of the Grunter have taken out about \$30,000, all of which came from above the 75-foot level, and made a very slight impression compared to what is left in sight up there. They worked the ore in an old-fashioned five-stamp mill, which is about worn out, and they are not able to build a new one suitable to handle this kind of a mine, consequently want to sell. It is a good proposition for a company with plenty of capital to work on a big scale. By stripping off the hanging-wall, which is very shallow for a good way below the croppings, it could be worked on the open-quarry system for a long while with a big mill. There is abundance of water-power and timber of all descriptions close at hand. The only setback to the property is its present isolation from a railroad point, which is 110 miles distant, and freight rates are high; but there is strong talk of a railroad coming within 20 miles of here to tap a big timber region, in which event this mine will stand a good show to come into market and make one of the biggest gold-producers in the Rocky mountains. R. BELL.

Shoup, Idaho.

Rains of Fish and Reptiles.

"During the storm Thursday of last week a strange phenomenon occurred in the vicinity of Blanco in this county, it being nothing less than the fall of a shower of fish. The fact of fish falling from the clouds is not an unheard-of occurrence, but fish such as fell at Blanco we never heard of before. They were of a bright silvery color, about two inches in length, and instead of fins they had sharp spines about one-fourth of an inch long where the pectoral and dorsal fins should be. Our informant, Mr. W. H. Crowe, has preserved a couple of them as specimens of great curiosity, as they are unlike any fish he has ever seen or read of."—*Salinas Journal*.

EDITORS PRESS:—Let me add to the above a little from my own observation. In the State of Nevada, in Lander county of that State, in the early summer of 1866, I drove a two-horse team to wagon toward the town of Austin from my then horse-ranch that was 70 miles east of Austin, and to shorten the journey, and as I had no load on the wagon, I followed the old military road, made by Col. Simpson immediately after the "Mormon War" of 1857, which led me over the high summit of Dry Creek mountain down to and across the head of Smoky Valley. I was going westward, and at the west flank of Dry Creek mountain there was a heavy body of Pinon pine trees where charcoalers were extensively burned for roasting silver ores in Austin. As I drove out of Smoky Valley, I mounted the low, wide, gently-sloping foot-hill of the Toiyabe mountain, which is thinly clothed with small Pinon and Janiper trees, and there in the wagon-road, through the trees, I overtook two long ox-teams, drawing two wagons, each piled high with sacks of charcoal, driving in procession, and as I was in no desperate hurry and could not very well drive past, I brought up the rear of the procession. As we slowly, very slowly, crept forward, I observed that away toward the top of Toiyabe there were dark, cloudy signs of elemental disturbance, albeit down where we were the earth was dry as the dust of Egypt, and the sun painted shadows on the desert. There came a swish of cool, almost cold, wind through the trees, and immediately after that I heard the forward teamster shout, in the true Misourian accent:

"Whoa—back!"

That had an effect that stopped the procession and caused the rear teamster to ask:

"What the —'s the matter?"

"Jist come yere and I'll show ye." And the Misourian stood leaning on his gad-stock, looking at the ground, and onreing in about seven different styles of profanity.

When the other driver and myself stood beside him, the three of us beheld a sight. The dry desert earth for some rods of area was literally covered with toads. If we had been in a toad territory it would not have been so astonishing; but, though I lived and moved and had my being in that section of country for several years, I never saw any toads there but those rained toads, except the horn toad, which is no toad at all. These storm toads were the regular old-fashioned "hop tods" of our boyhood; and these were of assorted sizes from one-half inch to an inch and a half long and "built in proportion."

"Where did they come from?" Go "ask the winged winds that round my pathway roar."

What became of them? They hopped about homeless and died—dried up and blew away like the leaves of autumn.

However, as I drove along same road on my return two days later, I found a county convention of owls in session among the Pinon Pines.

Watsonville.

The Stewart Mining Bill.

EDITORS PRESS:—I have been taking the views of all the miners in this district on the Stewart mining bill, and I have to find the first indorser. It is generally claimed that the laws are good enough and thoroughly understood; that the legal points have been settled

by the courts at great expense, and a new law such as proposed would open up a new field for litigation at the expense of miners.

The feature of prohibiting a person forever from relocating a claim once abandoned is much deprecated, but the one forbidding a person from locating more than one claim on the same vein is the most absurd of all. We all sincerely hope that the bill may not become a law. CHAS. J. BARCLAY.

Gibbenville, Idaho.

Traction Engines.

EDITORS PRESS:—Mr. W. C. Stevens of Chloco seems to have made more thorough inquiry regarding traction engines than any other man I have met. Like most other farmers, he is satisfied that the problem is solved and horses must go, but that the particular method of applying steam to the work is yet a matter of some experiment. He commissioned his brother, O. Stevens, of Clear Lake, Iowa, to visit all leading fairs last fall. This gentleman is a thorough, practical engineer and was very careful in his investigations, as his business letters and the 18 catalogues sent clearly show. W. C. Stevens himself personally visited all outfits of the kind in operation anywhere near Chico. O. Stevens reported that there were many good engines shown, but most were designed to propel themselves and threshing outfit and only very few had attempted steam plowing. He was particularly pleased with the plowing outfit of the Peerless, made by the Geiser Manufacturing Company. There seemed to be a question about stopping the engine to prevent wrecking plows where stones or stumps were struck. He saw them run the engine on top of a 4x4 scantling and stop there. They are made to turn very short corners. The letter did not deal with the materials and workmanship of the different engines so thoroughly as we should have wished. Durability in design and construction are the important points for California farmers. This is no gingerbread country for farm machinery. A machine may look pretty in its holiday paint and varnish and work smoothly on exhibition. When you come to plow adobe summer-fallow in April and May, or drive a harvester through grain that will yield 20 sacks per acre, you don't want a machine liable to break in any part, and especially if that part is some little costing that you must send away off for and possibly get one that doesn't fit when it comes. You don't want an insulator that the very elect cannot understand and that is liable to leave you a dry crown sheet when busy attending some other part of the work and thinking your insulator was all right. You don't want to stop at the top of every little knoll to pump your boiler full of water, or else run the risk of water all running to the front of the boiler, leaving crown sheet dry and causing an explosion when you strike level ground again. You want to put just as little strain on your drive-wheels as possible. It must be enormous at best, especially where you are sometimes called upon to throw nearly all the weight of engine, boiler and water tank on one wheel. Your bed wants to be rigid and your boiler tubes cannot be any too strongly fastened if the engine is to run night and day over all sorts of rough ground for 15 or 20 years.

Medium-Sized Engines.

It becomes a serious question whether our makers have not started out to build too large machinery at first. Is it not a fair way of looking at it to say that the machine should be adapted to the work, when you have thousands of acres of practically level land, generally so hard that a loaded wagon will scarcely make a track, no matter how large your engine? Take the average farm, some knolls, some sloughs, considerable turning, land sometimes soft in places, now and then a tree, stone or stump. It seems to these gentlemen as though a 16 H. P. was large enough for common use. Be satisfied with six 14-inch plows. Drive at 2½ miles per hour and you get a fraction over two acres every hour. Put on your headlights and double crew and you are getting in the 24 hours about as much work as you used to get from a hundred horses, and you stop feeding as soon as you stop plowing. When you come to harvest, no matter if you cannot drive more than a 12 or 14-foot harvester and sometimes have to take a little narrower swath where grain is very heavy, you can keep on at night until the grain gets too damp and make a good showing if only you have a machine that doesn't break down. These big machines make a great show on paper. We want the machine that will make the best showing in ten years' work in the field. Some have boilers too small and will run very well for 200 to 300 yards and then stop for breath just as the mules do on hot days.

Engines for Orchards.

Some two years since, a friend suggested an engine for cultivating a large orchard. It seemed visionary at first. Suppose the orchard has 200 acres or more and is practically level. Why not? If you are to keep up with the times, you must go over it once or twice a month from six to eight months. Leave a turn row at the end, and there is no question but that you can get around. Your engine will never bite a tree; your whiffletrees will never bark one. If an engine costs less than half what the horse cost to pull a plow in a wheat-field; if the fuel costs less than half the feed; if

it takes two men instead of six to plow six furrows, then why not an engine in an orchard?

Suggestions for Makers.

When you come to cultivating your trees, remember that the spring tooth is a success and that the Gale seeder has a good frame for carrying them. If you want to stir the ground on the Hetch system, the tooth must be made heavier, and it needs an extra point anyway, made of harder steel. Fix the lower end of your tooth to fasten it on so that your points can be renewed when worn. If you are stirring the ground away down and don't want to draw that two-inch surface against the dirt, take a half turn in your tooth before it is tempered above where it enters the soil, and another at the lower end to make a seat for your point. If you want to turn weeds under when they are little, make a reversible mold-board to go on your tooth large enough to turn a 3x6-inch furrow. Your spring will relieve it from any danger of breaking, no matter what you strike.

If you want to use the same thing as a seeder, you have the prettiest kind of a device for covering grain in these little plows. You can do a row of tress at a time with such a tool and your 16 H. P. engine, even when you are stirring that very loose dirt late in the season 12 inches below the surface to keep up the moisture, and shame the irrigators.

The Chico Engine.

Mr. M. L. Mery of this place is building an engine with which he has been drawing, on trial, three 12-inch Peerless gangs, plowing 12 furrows at once. He found the boiler too small, and is now reducing the speed to 2½ miles per hour by using a smaller pinion. He has several very valuable features in his design. He drives his traction-wheels from the rim, thus relieving axles and spokes of great strain that they must bear in the ordinary way of gearing. He also drives the guide-wheel in front, giving him greater power of traction and making his engine easier to turn. He can turn his machine, which is 20 feet long, in a 24-foot circle, and can go over the railroad track so carefully that you hardly notice a jer.

Farmers should do all they can to encourage and foster home industry, thus building up a home market, and consider the durability of the machine and convenience in getting repairs as well as first cost. F. S. CHAPIN.

Professors and Mines.

Of all ancient and honorable titles, this one of professor has certainly fallen into the hardest lines. Webster lines the definition—First, one who makes a public profession, especially of religion—and second, one who professes publicly to teach, especially an officer in a college or university, whose duty it is to instruct or read lectures. Abroad it is restricted to its proper use. In the whole of England there are not more than 30 men known as "professors." In the United States about 3,000,000, from the college down to the corn doctor. From the village schoolteacher, who boards around, gives instruction through the whole range of learning for \$25 a month, down to professor of mathematics, who gets \$2000 a year for teaching transcendental physics only, all wear proudly the grand old title, but it is in mining sections the professor flourishes to perfection. Talk about colonel in the South; why, in a mining section, professors are thicker than flies around the bungalow of an empty beer barrel in summer-time. "Professors" have been the curse of the Black Hills. Every fraud ever floated here has been booked by a "professor," their names would fill a column, and in almost every case the title was self-conferred, scarcely one having been entitled to it by any rule, custom or precedent. "Professor" and fraud have almost become synonymous terms—so much so that you can safely bet that any man coming into a mining section dubbed professor will bear watching. The Pioneer gives the advice to all reputable mining men who value reputation to "shoot" the "professor."—*Black Hills Pioneer*.

THE CHARLESTON.—Commodore and Acting Rear-Admiral George Brown of the North Pacific Squadron has announced his intention of bringing the cruiser Charleston from Mare Island Navy-yard, as soon as she has completed her fitting and taking of stores, to the lower bay and anchoring her in the stream at some point easily accessible from the water front, in order that the people of San Francisco may have an opportunity of inspecting the first Pacific Coast built man-of-war before she goes to sea upon her first voyage. The first date of her appearance in the harbor is, it is understood, March 1st, and as she will not put to sea until April 1st the citizens of this city and vicinity will have one full month during which to visit and inspect the new cruiser, which, as the first warship ever built upon this coast, should be an object of interest to every one having Pacific Coast interests and industries at heart. While in the harbor a daily detail of officers will be made whose duty it will be to explain to visitors all matters appertaining to the working of the vessel and her batteries.

THE town of Burke, Idaho, in Cœur d'Alene district, had a snowslide last week, when three men were killed. The Custer mine, on Nine Mile creek, had a snowslide at its boarding-house, where six miners were killed. Other avalanches have occurred in the same region.

Not All Fancy.

Without any violent stretch of fancy, we may anticipate that the old proverb that every cloud, however dark, has a silver lining will find an exemplification in the coming season. We are just emerging from a long, dreary spell of bad weather—an unusual downpour of rain and snow that has greatly deranged travel and transportation and inundated the ranches and lowlands in the immediate vicinity of rivers. Business in the towns and cities has been largely depressed, and crowds of idle men thronged the street and every niche and corner where they could find warmth and shelter. So great has been the distress that the poor have suffered for fire, food and other necessities, and free lunches and free lodging-houses have been temporarily established for the assistance of those who were willing to work but could find nothing to do.

And yet we may assume that this long stretch of bad weather will not turn out to be an un-mixed evil, for, while it has quickened the humanity of the well-to-do people, it may also be regarded as the harbinger of a most prosperous year. In spite of mud and rain and the sneezing of la grippe, it means a mine of wealth for every section of the State, the contribution of all that goes toward making a thrifty community and happy people. It means that the mine will be filled with the gold and silver products of the hills and mountains and the huge warehouses with hundreds of thousands of tons of grain. It means a general activity of men and horses, barges, steamboats, foreign ships and miles of freight cars, and bright, busy and joyous energy everywhere.

There is really no good cause for moody complaint or gloomy forebodings. The paroled scil, especially in some of the more arid valleys, needed a thorough soaking, and the springs and wells that had well-nigh failed will abound and flow with an abundant water-supply. The whole State will exult in the refreshing baptism, the deserts blossom as the rose, the hills and mountains leap with gladness, and the orchards and fields, vines and young trees clap their hands with joy. Plowing and pruning for a few weeks may be retarded, but in a climate where the season for labor is so long and reliable, a few weeks' delay need cause no alarm.

In short, while there is no need of disguising the fact that there has been a considerable loss of property, the wheat crops in some places destroyed, a few orchards badly damaged, the aggregate result of the immense rainfall means a year of splendid results. The money channels will be fresh, and men who are in debt will be able to pay and feel free of that ugly incubus. They will be able to improve their farms and homes, and in various ways carry out the plans they have long entertained for the pleasure and comfort of those they love. The country homes will be made more cheerful with vines and shrubbery and rare exotics; with books, music and pictures, and all that pleases the eye or regales the taste. Even fences, highways and bridges will feel the impulse of the good times, and the land be blessed with better schoolhouses, churches, and other public edifices.

In the cities, the great distributing centers of the State, labor will be more likely to find employment, and employers will feel more hopeful and generous. Poverty will in some measure lose its most powerful and mortifying sting, and as a result we may hope that the calendar of the criminal court will be less crowded. With the stir of the expectant and enlivening times, those who have the charge of the health, comfort and sanitation of the various towns and cities will be encouraged to go ahead with their plans of improvement, perfect sewerage, more permanent and cleaner streets and all other things that make for the general good.

Now we feel sure that this picture is not all fancy; is really but a faint outline of the joyous prosperity and happiness that will soon burst upon us, whatever a morbid and grumbling pessimist may say to the contrary. And surely no one can deny that if all the blessings enumerated above should take place, the State, with all its charms, would be a more inviting abiding-place, and health and morals greatly benefited. The advent of active business will be upon us in a few weeks, and we may just as well anticipate it by a general cleaning up. In the city much may be done for imperfect sewerage, bad sidewalks, dirty streets and spots of filth; and in the country, aside from the work of the eye and pruning-knife, fences and gates may be repaired, yards and gardens put in order, houses painted, the walks adorned with flowers of all hues, the windows and porches mantled in sweet vines, and the whole country made a picture of beauty and a psalm of praise.

And while we write thus under the witching influence of the welcome sunshine which has been so long withheld, we are not at all un-mindful of the serious individual losses which have been visited upon many of our citizens. We do not forget that some of them have been driven from their homes by the high water which has destroyed their levees, drowned their cattle, and in many cases wrought serious injury to their buildings and fences. Nor do we forget that many a pretty piece of hillside, orchard or vineyard has been gullied or "ploughed off" by the unwonted precipitation. Local injuries have been done which it may take years to repair, and in some cases the burden of tax-

ation will be raised to restore public improvements. And yet on the whole the generous water supply will be a blessing, as we have intimated, and we trust that in the wise distribution of good things, a kind Providence may grant a double share of prosperity to those who have suffered most.

Montana and Michigan Copper.

A correspondent of the *Portage City Gazette* says: "The Lake Superior mines produced in 1889 just about the amount of copper they did in 1888. Can they increase their output very materially in 1890? The Tamarack expects to be producing before the end of the year at nearly double the present rate. The Osceola expects to get out more. There may be one or two mines which will get out less. I do not think of any more from which an increased output is at all certain. Some of the Calumet's competitors say that that great company cannot materially increase its output for some three or four months yet."

"And as to new producers at the lake, there is little to fear. I hear that the Allouez cannot make much copper inside of four months."

"Looking to other copper-producing sections, Arizona maintained in 1889 the production of 1888, an amount hitherto unprecedented. New Mexico can produce more this year than last. All other sources outside of Montana are not important. In Montana the increased production of 1889, as compared with 1888, was over 7,000,000 pounds. But even in Montana, the old producers—the Anaconda and the Parrot—produced less than in 1888. The Boston & Montana produced over 8,000,000 pounds more than in 1888. It will produce even more in 1890. The Anaconda produced 61,647,000 pounds in 1889."

"On the whole, it may be a conservative estimate to allow that, normally, with copper at 14½ to 15 cents, production in this country would increase ten per cent. Outside of the Anaconda, that would mean a total production of 192,500,000 pounds, or 197,500,000 pounds including imported ores. Add 65,000,000 pounds in stock on January 1st, and we have a total supply for 1890, outside of the Anaconda, of 262,500,000 pounds. As notwithstanding the superior market in this country, exports in 1889 have been 82,000,000 pounds, and larger than in 1888, we may safely allow for equally large exports in 1890. These exports reduce the total supply for home needs in 1890 to 180,500,000 pounds. Now, consumption in 1889 was 169,600,000 pounds. It seems to be larger now than ever. How much larger now than in 1889 it is impossible to say. If it is only ten per cent greater, the consumption in 1890 will entirely eat up the amount left to meet the demand, always remembering that no allowance has been made for the Anaconda. From these rough calculations the importance of the Anaconda fire becomes apparent, and until the fire is out and the mine again producing, the copper market will perforce remain buoyant."

THE LATE CHESTER S. LYMAN.—On the 29th ult., Prof. Lyman died at New Haven, Conn., where he had been for many years Professor of Industrial Mechanics and Physics, and then Professor of Astronomy and Physics at the Sheffield Scientific School of Yale University. Prof. Lyman was in California as early as July, 1848, and was one of the first to visit Sutter's mill, where he wrote an account of the discovery of gold for the *American Journal of Science*. In 1850 he went back East, taking with him many nuggets of gold, one of which weighed two pounds. He returned here in 1854, and remained until 1857, going hence to the Sheffield Scientific School. In 1871 he constructed an apparatus for describing acoustic curves, also making improvements in clock escapements, compensating pendulums and other apparatus. Prof. Lyman was the first to observe the planet Venus as a delicate luminous ring when seen in close proximity to the sun near inferior conjunction. Prof. Lyman retained the professorship of astronomy and physics up to the time of his death, although long disabled from performing its duties.

ELECTRICAL SOCIETY.—On the 3d inst. a meeting of the California Electrical Society was held, at which the following officers were elected: President, N. S. Keith; vice-president, Orion Brooks; secretary, W. W. Wright; treasurer, W. H. Hanson; Executive Committee—A. W. Smith, E. A. Roe, H. T. Bestor. The following were elected honorary members: A. G. Davis of Baltimore, Geo. H. Pride of New York, P. B. Cornwall, L. L. Baker and Alvinza Hayward. It was decided to remit the dues for December and January, as no meetings were held in those months.

COPPER IN THE UNITED STATES.—The total production of copper in the United States in 1889 was 241,830,000 pounds, including 236,730,000 pounds from domestic ores and 51,000,000 pounds from imported ores. The total production in 1888 was 232,853,456 pounds. The stock on hand December 31, 1889, was 65,000,000 pounds, against 75,000,000 pounds on the same date in 1888. The Anaconda mine, with 61,647,000 pounds, was the largest producer of copper in 1889. Next came the Calumet and Hecla, with 48,640,029 pounds.

Making Good Citizens.

The annual report of Ira G. Hoitt, State Superintendent of Public Instruction, for the year 1889 shows that there has been expended in this State about 15 per cent more for all purposes in conducting the public schools than during the preceding year. For this increased expenditure the State has to show 218 new schoolhouses, erected during the year, and a daily average attendance of 11,500 more pupils than during the former year. The report further shows an increase of two per cent in the number of teachers who have been trained for the profession in normal schools. On this showing, Superintendent Hoitt may congratulate the people of the State on receiving so large an equivalent for the money expended in the maintenance of the public schools.

Now we may well ask, why should the State go to all this trouble and expense? Surely not as an act of charity. Were this the inspiring motive it would be difficult to know where to draw the lines of limitation to its benevolence. Why not establish clothing stores, soup kitchens or free restaurants in the immediate vicinity of the public schoolhouse? Why not provide bread for the children, as well as books of instruction? The reason should be obvious; the State assumes the education of the children for the purpose of making good citizens of them, to prevent the breeding up of a generation of ignorant or indifferent voters, in whose hands the ballot might prove a frightful weapon of anarchy, of misrule, if not of destruction.

What then may we consider the first and essential quality of a good citizen? "We want thinkers, we want them," said Coleridge, speaking of the religious narrowness and bigotry of his day, and the same stinging epigram is applicable to citizenship in a great republic. We want voters who can think for themselves and who cannot be herded and bell-wethered to the polls; voters who can weigh evidence, who can detect the fallacies of an argument, who possess a patriotic conscience rather than a partisan one, who know the right from the wrong thing and whose ideas of justice cannot be warped and biased by party prejudice or the special interests of a guild or class. While this would be a good thing for any Government, it is absolutely essential to the welfare of a democracy, where every man is a sovereign to the extent of his vote.

For even majorities may become despotic and dangerous. Just as an infinitude of separate fibers may be twisted into a hawser strong enough to hold a ship or pull down a tower, so a sufficient number of individual votes may aggregate into a stupendous power that may shake with the potency of an earthquake the honor and stability of any State or municipality when stirred by ignorance or passion.

And never before in the history of the world was intelligence, as a factor in political affairs, more imperative than now. There are men now living, who, within the limits of their own memory and experience, have seen greater changes in the complexity of our civilization, in the growth of wealth and the methods of production and exchange, than occurred in any 500 years before the present century. Compare the slow settlement of the New World, the 200 years of struggle with the dense forest and the wild Indians, with the rush of enterprise, the din and clang of machinery that came in with the era of steam. Compare the staid, timid commerce of those early times creeping along the rivers on rafts, in flatboats, "broad-horns," or buzzing the shores of the sea, with the majestic steamers that cross the Atlantic within a week, and the locomotive, railroad and telegraph lines that open an empire and build up a city in a day. Think of the tremendous mastery that has been achieved by modern genius over the mighty forces of Nature which are now at work for us in mill, shop and field. Think of the wonderful and perplexing questions that this age has thrust upon us for solution, questions of adjustment to the new environment; wealth running into despotic monopolies; syndicates of trusts that are swallowing up small enterprises, as the sea swallows its ripples; questions of labor, taxation, tariff, immigration, and kindred things thrown to the surface by the new age. We have evoked the fabled geni from his hiding-place, and it remains to be seen whether the possession of its power shall prove a profitable servant or a hideous monster of cruelty and oppression.

Now, these and kindred questions must be met face to face and solved by the men and women who are now being trained in our public schools; and a point that we may seriously consider is, whether these schools are adequately meeting this need of our population. The methods still largely in use of determining the merits of teachers and scholars by book-questions has created the aspersion they are not. No doubt thousands of young men and women are made to believe every year that they have received a good education, when really they are actually helpless in the art of making a living. But there is no great cause of complaint, for no one can read the educational journals or listen to the papers and discussions of Teachers' Institutes and fail to see that our leading educators are fully aware that the educational methods of the past belong to the past, and that no man can be regarded as educated who does not feel the stir and thrill of the spirit of his own age and knows how to make himself at home in it.

Road Work.

There are two seasons when the rural mind is forcibly called to the subject of roads; when he is mired to the hubs in a river of mud and when he is choked with dust or feels his vertebrae snap in buck-holes. Just before the dust forms and just after it is laid by the early rains, the easy-going ruralist is ready to declare that a dirt road is the most comfortable road in the world.

It does seem that this winter's experiences would be enough to overcome the inertia even of the easy-going citizen, and impel him to some effort for better highways. California has some most excellently made and zealously cared-for highways, than which better cannot be found in any farming country, but the leagues of abominable mud streams which now connect our farms and villages are a disgrace to any progressive commonwealth and a decided detriment to prosperity and progress.

We are well aware that it is very expensive work to make good roads in some of our valleys. There is no adequate supply of gravel, and the distance to rock quarries is very great. There are places where the only practicable way to get good road material is to bring it in by train-load. Of course when this is so and the district is sparsely settled, it is hardly within the possibilities to secure a great length of good roadbed. But there are many people in some of our most prosperous valleys owning improved land worth several hundred dollars an acre who can hardly drive outside their own gateways without losing sight of their horses' legs. Such people haul through deep mud all summer and flounder through deep mud all winter, and apparently make very little effort to escape either disagreeable and expensive operation. What little work is done by the constituted authorities is done at the wrong time or in the wrong place, and the resident puts in a good part of his leisure time in growling at the roadmaster.

We would like very much, now that the subject is brought forcibly to attention by existing conditions, to have our readers occupy part of our space in a timely discussion of road-making. If the existing system of road work and road management is wrong and to blame, let us hear all about it, and how to improve it as a branch of the public service. If it is desirable to do away with existing machinery and portion out the road to residents individually or co-operatively, let us hear what has been done or can be done in that way. This project is now being urged upon the Boards of Supervisors in some parts of the State, and there should be something worth hearing to see about it.

Then, after systems are disposed of, let us hear how some of the notably fine roadways of the State have been made and at what cost. Many people do not have very clear ideas how to make a good road, even if they have a good disposition to do it; so let us have plain directions from those who have succeeded in making a good piece of road with different materials, which were available.

There could hardly be a more interesting or profitable subject for discussion, now that there is a good chance to see just what road is good and what is poor, and if we can have the suggestions of a score or two of our practical readers just at this time, it may result in adding hundreds of miles of good roads to our State before another winter comes along.

"ARCHIE" BORDLAND, who died in Oakland last week, was a mining man known all over the coast. He has been in California since 1852 and first worked in the mines in Grass Valley, going also to the Frazer river mines and other "excitements." He went to Virginia City in the early days of the Comstock and worked as a miner in the Gould & Curry and as brakeman in the Savage. He made considerable money in the stock market through the ore discoveries in those mines and in the Yellow Jacket, Crown Point and Belcher, and ceased his laborious work and became a keen speculator. He was one of the largest, if not the largest, outside holder of Consolidated Virginia and California stocks at the time of the discovery of the great bonanza, and these and other fortunate investments and daring operations enabled him to amass a vast fortune. Of late years he has been interested in mines and cattle ranches with Geo. W. Grayson.

THE Bodie Miners' Union elected the following officers at a meeting held January 21st: President, J. M. Donohue (re-elected); Vice-President, G. K. Fitzpatrick; Recording Secretary, W. A. Bradshaw; Financial Secretary, A. P. Cameron; Treasurer, D. J. McDonald; Conductor, Richard Noonan; Warden, M. Currie. Finance Committee—M. L. Virden, W. J. Fitzgerald and Sam Tyack. Board of Trustees—Archie Graham, Alex. Drennan, Angus Falconer, Eugene Fitzgerald and James Glenn.

NICARAGUA CANAL.—A letter has been received in this city from General Boehke, Chief Engineer of the River, Harbor, Canal, Dredging and Land Co., in which he writes that the contract for the eastern half of the Nicaragua canal will be given to an Eastern company and at low figures, as the competition is very great; on the western slope there are no competitors, and that his company can have it at fair prices. The contract is said to involve an expenditure of from \$5,000,000 to \$8,000,000.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

AMADOR MINES IN NEW YORK.—*Ledger*, Feb. 8: The most phenomenal advance of the week has been in Sutter Creek, which rose from 6½c last Friday to \$1.75@2 to-day. Those owning a controlling interest in the company assert that they have sold enough stock to raise the \$15,000 originally wanted to provide a 10-stamp mill for the property, with water facilities, etc. They claim to have no more stock to sell at any price, and say that this week's advance has been caused by legitimate inquiries from those who have faith in the mine coming upon the market when no stock is to be had. As these orders are as yet unfilled, if buyers persist, it is argued that a further advance is probable. While this may be true, an advance of over 200 per cent, simply on "expectations," particularly in a dull market unmarked by any great speculation fever, is always suspicious. Probably the truth of the matter is, that it was decided that the stock could best be disposed of by making it active and advancing, rather than by selling at a fixed price.

MISCELLANEOUS.—Most of the mines are still kept busy hoisting water. The flow is decreasing, but very slowly. The Zelle mill is running 20 stamps. The Keystone is doing little else than taking out water. The Cosmopolitan mill has been running steadily, and the result of the first cleanup is awaited with much interest. Work will be started shortly at the North Gover. The North Star Improvement Co. is determined to prospect considerably more before abandoning the enterprise. They have paid 16 assessments without a single share being advertised as delinquent.

Calaveras.

WATER SKIPS.—*Mt. Echo*, Feb. 8: Mining men will do well to examine the two new water skips at the Angels mine in this town. They are a positive and ingenious departure from present devices, and indicate superior utility and general excellence. These skips are made of steel one-eighth of an inch thick, and weigh about 1000 pounds each. Their cubic capacity (each) is 54 cubic feet—over one and one-half tons of water. They were built by Thos. Fullen and Cyrus Condo, master mechanics at the Angels mine. The essential and distinctive feature of these machines, or rather vessels, is a door on one side and near the bottom of the skip. This door is so arranged and constructed that it is operated by a lever attachment, automatic in character. On arriving at the surface, or wherever it is ordered to deliver the water, the lever, the end of which is provided with a small roller, moves up an oblique surface, thus opening the water door. The bottom of the vessel is fitted with a 14-inch valve. This discharging of the water is done with less mechanical work and more expeditiously than in the present mode of tipping the vessel.

IMPROVEMENTS.—From the testimony of developments and from authoritative expressions of leading mining men of this place, the public mind admits that this spring and summer will witness the most important and prolonged mining campaign that has ever attended the industrial history of Calaveras. New and larger mills will be built on the great lodes here, and large forces of men employed. The extent and character of several years of intelligent exploitation developments at the Uica, Angels, Gold Cliff and Tulloch & Lane mines, have established positively and effectually the permanency and profitable results of deep mining. Science, brains, muscle and some capital will shortly make the earth yield up its hundreds of thousands. Otto Dolling has commenced operations again on his mine near Alhany Flat. Much is expected from this mine, as the yield of a ton of the ore at the Selby Reduction Works some months since was over \$320. And work since then and until the rains set in developed better ore than that. The width of the lode is not yet determined. Mining experts of ability, as well as first-class practical miners, express the opinion that the Calaveras mine, situated at Robinson's Ferry, is destined to become one of the leading mines of this county. Work is progressing on the Star of India mine near Smith's Flat. The Chicago company now working the property has commenced developments in a business-like manner. The Whittle mine, owned by Mr. Peet, and located near Alhany Flat, is being worked steadily and with excellent results. Work is going on actively at the Lane & Tulloch mine, in the southern part of this town. The mine is yielding good returns.

Inyo.

BORAX.—*Independent*, Feb. 7: M. Bush came in from Saline valley last Monday. He brought along samples of borate of lime from his borax location. This is the richest form in which borax is found and Mr. Bush has one location of 260 acres that carries that kind of material. John Stoutenborough of Bishop, and John F. Miller of Benton, were at Saline last week, and they, together with Mr. Lent, made some locations of borax land. It is understood that Mr. Cox, a Boston man, is an equal partner with the three named before. These parties propose to go over the valley soon with a large outfit for a borax camp. Mr. Bush says Conn & Trudo have a large quantity of borax at their camp all ready for shipment, but there is scarcity of teams.

A GOOD PROSPECT.—The prospect is good for a considerable revival of business at Darwin as spring opens. It is said on what appears to be good authority that Hon. P. Reddy has bought the waterworks and will make a good deal of improvement thereon. Mr. Reddy has already put up two jiggers and these are now being worked on ore from the Defiance. Each machine will work from four to five tons of ore per day. An immense amount of ore is on the dump and more machines will be added. J. A. McKenzie continues shipping ore from the Lucky Jim. J. C. Eddy recently put some men to work in the Promontory and will increase the force there and in other mines as soon as spring opens. C. Anthony has again got the road open up through Sherber's Canyon to the Riley mill and has teams hauling wood. He will be ready in a few days to start up the mill again and a good deal of work will be done there. A few more men have recently been put to work in the

Defiance mine and more would be employed, but there are no idle miners at Darwin. Altogether the prospects for that camp are very good.

CERRO GORDO.—*Inyo Independent*, Feb. 7: At Cerro Gordo the work of timbering Union shaft is reported to be nearly completed. Already, it is said, some men have been put to work prospecting in the mine, and this force will likely be largely increased when the shaft shall be completed.

HAULING BORAX.—*Index*, Feb. 6: Mr. J. D. Marshall of Keeler will put his team at work hauling borax from Saline valley to Alford. The haul is 50 miles and it takes a week to make the round trip.

Mono.

A BIG PLACER SCHEME.—*Homer Mining Index*, Feb. 6: John Elbert, secretary of the old Mono Lake Hydraulic Mining Company, has been in this vicinity for some days, presumably looking after placer ground in the valley between the mouth of Mill Creek canyon and the big lake. Twenty-four claims of 160 acres each have been located and recorded, aggregating 3840 acres. Each 160-acre claim bears the names of eight locators. We are informed that Jack Skewe's re-emption claim and that of Stewart, Loose and Burnside are covered by the new mining locations. These lie immediately south and east of the Locoville, and were taken up as agricultural land. The old Mono Lake Company holds patents for three 100-acre tracts, Callinan's station being on one, which reaches nearly to the great moraine which extends across the canyon this side of its mouth. It is said that a great hydraulic mining scheme is being projected, but whether by the old company or a new organization has not been learned, but as it is said that the above-mentioned locations have been made at the instance of and in the interest of Mr. Elbert, we presume that the old company is at the bottom of the new project.

Nevada.

NORTH BANNER.—*Grass Valley Union*, Feb. 6: The pump of the North Banner mine started up on Tuesday evening, and Supt. Skewes says the water will all be out of the mine by the last of next week. A good deal of water is coming down through the old workings, but this is caught up on the drain tunnel level, and is making quite a strong head. Snow yet lays to a depth of 4½ feet at the mine.

MANZANITA GRAVEL MINE.—The Manzanita gravel mine at Nevada City is to be reopened by sinking an incline in new ground in the eastern portion of the location. The old tunnel will be abandoned on account of the constant caving of the overhanging banks.

THE WATER.—*Grass Valley Union*, Feb. 12: The water in the Empire and North Star mines is now under control, but it was a hard fight to prevent it from getting the mastery. Everything is going on favorably at the Crown Point mine. Wolf creek is now furnishing sufficient power to run the machinery, the accumulated water in the shaft has been pumped out and the work of sinking the shaft resumed. Mining work in the district is being gradually resumed, and the crowds of miners who were kept in enforced idleness for some weeks by the stormy weather are mostly employed again.

Placer.

GOLD RUN.—*Cor. Placer Republican*, Feb. 5: All of our drift mines are abandoned, as no provisions could be got to the miners. The Indiana Hill Co. took their men away from the mine last week. This mine is operated by Chinese and managed by Ti Sing. Many old mountain prospectors and hunters have been driven in on snowshoes by the storm. The snow is 6½ feet in depth on a level.

San Diego.

THE STONEWALL.—*Julian Sentinel*, Feb. 9: The mill was, practically speaking, finished and put in operation the 1st of this month. Mr. C. Lynn, the contractor, and E. Cameron, the foreman on the works, left for their homes in San Francisco. We were out there one day this week, and counted 30 stamps pounding out the yellow dust. We were shown through the mill and hoisting works, and although we are not familiar with the different methods of mining, we venture the assertion that there is not a more complete plant in the State. The owner is justified in being proud of this property. The district should be proud of it. Five years ago this mine was simply a hole in the ground, which at one time paid well, but was supposed to be worked out. It was then in the same condition that dozens of mines in this district are to-day. It only wanted energy and capital to make it the foremost mine in the State. In another five years we expect to see a number of our mines, now idle, equal the Stonewall in richness and production. The mines are here, and capital will come and develop them, and it's coming soon.

Shasta.

OLD DIGGINGS DISTRICT.—*Redding Free Press*, Feb. 8: It is some time since the Old Diggings materialized in the *Free Press*. We have not all been snowed under, but pretty near it. The snow was from 16 inches to two feet deep and did some little damage here. The roofs of several sheds broke down, and Flanagan & Forbes' mill at Star gulch is completely caved in. Notwithstanding the exceedingly bad weather, nearly all the mines are doing something, and we understand that operations are to be resumed at Quartz Hill this week. Somebody with capital will make a big thing out of Quartz Hill some day. Walker Bros. mill is shut down, as the roads are too bad to haul quartz. Superintendent Rippetto has gone to Salt Lake City, but work in the mine is going on, however, driving the lower tunnel. Messrs. Hart & Fleming have been running their mill all through the storm with the exception of a few days when the ore team had to go to town to get some feed. Thompson & Jones have taken another contract in the Mammoth tunnel. Mr. Butters shipped a carload of concentrates from Walker Bros. to his works at Kennet this month.

CALUMET.—A. B. Paul of the Calumet mine went to San Francisco Wednesday morning. Mr. Paul says that the high water in the river did not quite reach the railroad track. He was obliged to shut down the mill for the reason that the foundation to the engine and hoiler became unstable by reason of the seepage water from the hill above.

STRIKE.—*Shasta County Democrat*, Feb. 12: Last Thursday a German prospector made a rich strike near Anderson & Berg's mine, in Lower Springs district. He was out looking for a ledge and came across a gopher hole. He panned out some of the dirt in the hole, and was surprised to find the hot-

tom of his pan literally covered with the "yaller truck." He tried another panful, meeting with the same success. He thinks he has struck a bonanza and has gone right to work on his new find.

ORE.—Anderson & Berg commenced shipping ore from their mine in Lower Springs district Monday. The ore is hauled from the mine to Middle creek, and from there shipped to the Selby smelting works. Some parties have taken up mining claims along the river between here and Middle creek, in order to secure an immense quantity of logs and driftwood brought down by the recent high water. They will have any amount of good stove wood.

LOWER SPRINGS DISTRICT.—*Cor. Shasta Co. Democrat*, Feb. 5: When I reflect upon the immense showing for good times that we have here, why some of the money and labor was not spent in actually developing the mines deeper than mere surface scratching, is really a difficult matter to solve. We have in our midst two reduction works and one or two free mills, and one reduction works is in course of erection; also one other free mill. This mill speculation is a sad one to our mining district. I believe all of the mills in this district are idle; it may be the stormy weather that has so stopped the progress of milling ores in this district. We have about 16 miners and all of them have from two to six mines which prospect well, and we have three mills; one of these has a good ledge, the others have none. The average capacity of these mills altogether is 40 tons per 24 hours. The poor miner has monopolized very near all the paying mines here, and the most of them are too poor, some too lazy, and others too high-priced to allow capital to purchase from them any portion of their property, and as it now stands mostly in the hands of poor men and unreasonably ones, too, our mines here are valueless under the present situation. And what are all of those poor millmen or companies going to do for ore? The mill companies are lost to know just what to do. They simply build up and tear down and replace different kinds of machinery, keeping them in a financial embarrassment, better described as keeping their noses to the grindstone.

Sierra.

AN ENGLISH CO.—*London Mining Journal*, Jan. 12: There has been organized in London a company to acquire and work the Mountain Ledge mines, situated about three miles northwest of Sierra City, on the Sierra Buttes, and in a direct line between the Sierra Buttes and Young America mines, which have both returned immense quantities of gold. The property consists of the Mountain mine, held under U. S. patent, and six claims adjoining, which give a continuous run of about 7000 feet on the course of the ledge or vein which is being worked on in the Mountain mine. There are also millsites on the right bank of the north fork of the Yuha river, together with a water right securing an ample supply for milling purposes. According to the prospectus, the Mountain mine has been well opened from the cap of the ledge to a depth of 600 feet, and is now in a fit state of development to keep a 40-stamp mill in full work, and its further development can be carried on with rapidity and economy. The property was examined in September last by an engineer on the staff of Messrs. John Taylor & Sons, and they estimate that the reserves of ore proved by the development works to exist above the level of No. 3 tunnel amount to 50,000 tons. At the conclusion of their report Messrs. John Taylor & Sons say that "they can with confidence recommend the property as being a good investment and likely to prove continuously remunerative." Provision is made for £35,000 working capital which is estimated to be sufficient to erect a 40-stamp mill and other necessary plants, and pay the mining cost until the mill begins working and leave £10,000 to provide for contingencies. The price paid for the property by the company is £65,000, of which the vendors elect to take £30,000 in fully paid-up shares of the company.

Trinity.

DEADWOOD.—*Cor. Trinity Journal*, Feb. 8: A slide occurred last Saturday at the turn in the road just above Mr. Leonard's house that moved one of the cabins from its foundation. The cabin was occupied by some of the miners as a sleeping apartment, and they were in the cabin when the slide occurred. Another slide just above the Brown Bear mill occurred the same day, covering the mouth of what is called the West tunnel, and burying five cars. The tunnel was completely dammed up, but the pressure from the water from within soon forced the mouth of the tunnel open, when the water and gravel came down in immense quantities as if a large reservoir had broken loose, running directly through the mill, and nearly covering the concentrators and depositing about two feet of mud and gravel all through the mill. The fire in the furnace was immediately extinguished to prevent damage by fire in case any more slides came down. Of course the mill had to be closed down, and it will take several days to repair the damages. This is the only mill on the Deadwood divide that has succeeded in running constantly during all the cold and stormy weather of the season, and it is really quite a misfortune to be compelled to close down at this time.

Tuolumne.

FREE GOLD.—*Union Democrat*, Feb. 8: The report from the Mary Ellen mine is very favorable. It steadily improves as the work of development goes on. The two strikes recently made of ore rich in free gold are very important, as they indicate the existence of a large pay chute of ore. It is in fact the union of two chutes constituting one large body, and also proves that the ore goes down and increases in size and depth.

BLACK OAK.—The Black Oak mine and milling property, situated near Soulsburyville, will be sold by the sheriff to-day, to satisfy a judgment obtained by W. G. Scott.

NEVADA.

Washos District.

SIERRA NEVADA.—*Virginia Chronicle*, Feb. 8: Underground operations, temporarily suspended the largest portion of the week on account of the scarcity of fuel, will be resumed with the usual force next Monday.

CON. CALIFORNIA & VIRGINIA.—The extraction of ore, suspended pending the snow blockade, is resumed and shipments have been made to the Morgan and Eureka mills during the past four days. On the 1650 level the raise above the end of the east

crosscut from the end of the north drift from the winze, sunk 60 feet below the end of the south drift, has been advanced 23 feet and the top is in quartz. The raise above the end of the north drift, from the main west drift from the C. & C. shaft, is up 8½ feet. Shipped to the Morgan mill 902 tons and 1090 pounds of ore and to the Eureka 639 tons and 1040 pounds; battery sample assays showing an average value of \$27.50 per ton. Bulion valued at \$54,675.71 shipped to San Francisco.

UNION CON.—On the 1465 level in the north lateral drift 100 feet south of west crosscut No. 3, west crosscut No. 4 is advanced 184 feet, and continues in porphyry and clay.

MEXICAN.—On the 1465 level west crosscut No. 3, 100 feet south of No. 2, from the north drift from west crosscut No. 1, from the main north lateral drift, is extended 3 feet in a porphyry formation.

OPHIR.—On the 1300 level from the end of the east crosscut from the shaft station a south drift is advanced 333 feet, from the end of the east crosscut, 316 feet from the shaft station, continuing in porphyry and quartz.

GOULD & CURRY.—On the 200 level the south-west drift is extended 340 feet. Formation, quartz, showing some value. On the 400 level the south-west drift is extended 85 feet. Formation, porphyry, clay and quartz, showing some value.

BEST & BELCHER.—On the 1000 level east crosscut No. 1 extended 132 feet. Formation, hard porphyry. On the 1200 level the north drift is cleaned out and repaired 193 feet.

SAVAGE.—Daily shipments of 60 tons of ore resumed and the usual exploratory work is in progress from the 400 to the 900 level.

HALE & NORCROSS.—The usual exploratory work is in progress. Ore shipments to the Nevada mill were resumed Feb. 5, averaging 150 tons daily.

CHOLLAR.—Crushing 60 tons of ore daily, pulp assays showing an average value of \$22.50 per ton.

POTOST.—The 930 level east crosscut has entered low-grade quartz. Repairs to the timbering of the openings on the 650 level still in progress.

ANDES.—North compartment of shaft opened to the 420 level and repairs in progress to middle compartment preparatory to drifting for downward continuation of ore developed on 350 level.

IMPERIAL.—Operations were resumed February 4. The 300 level west crosscut, No. 2, is cutting occasional ore bunches. The 500 level west crosscut is in quartz. The 500 level north drift is out 1338 feet from the Yellow Jacket shaft.

ALPHA.—The 600 north drift continues in quartz showing fair assays. The 500 level west crosscut is in low-grade quartz and porphyry.

EXCHEQUER.—The 500 level east crosscut at the Alpha line continues in quartz and porphyry.

WARD COMBINATION SHAFT.—The 1800 level east drift is advanced 192 feet.

OVERMAN.—Will resume ore shipments next week.

NEW YORK CON.—Opening the 600 level to cut upward continuation of ore developed on the 800.

CALEDONIA.—West crosscut No. 3 is in low-grade quartz and porphyry.

CROWN POINT.—Ore shipments resumed and average 150 tons daily. Pulp assays show an average of above \$18 per ton.

BELCHER.—The 850 level east crosscut continues in porphyry. Explorations resumed at all points.

SEG. BELCHER.—Ore bunches still showing in the 1200 level drift from the winze. The 1000 level east crosscut continues in low-grade quartz.

SILVER HILL.—Usual progress made in 160 and 260 level explorations.

JUSTICE.—The mill is crushing the usual amount and quality of ore.

ALTA.—The mill is again in full operation crushing the usual amount of ore, pulp assays showing an average value of \$24.50 per ton. The northwest drift from the winze bottom, below the 925 level, is in low-grade quartz.

UTAH.—On the 600 level the southeast drift from the shaft station is extended 840 feet. Formation, soft porphyry, with clay, quartz and water.

OCCIDENTAL CON.—Continue to extract ore of good quality from the stopes on the 400 and 450 levels. The 500 level west crosscut has reached the footwall. Have started a raise 100 feet south of No. 3 raise. The 550 level east crosscut is advanced nine feet in porphyry and clay and the west crosscut has reached the footwall. From the end of this crosscut have started a south drift in ore of fair quality.

NORTH OCCIDENTAL.—The 550 level joint east crosscut is extended eight feet in porphyry and clay. The joint west crosscut has reached the footwall and from the end of it a north drift is started in fair quality ore.

Cherry Creek District.

LITTLE DOING.—*White Pine News*, Feb. 1: A corporal's guard of men is employed at the Star and a couple of miners at the Exchequer. Apart from this, mining has virtually ceased for the time being. Notwithstanding this direful state of affairs there exists a well-grounded belief that there will be ere long a resuscitation of the mining industry and a total eclipse of Cherry Creek's former palmy days in the glory and magnitude of its future output of treasure. This language may seem extravagant, but such is the prevailing sentiment, and it is proclaimed by all familiar with the mineral resources of this and neighboring districts.

Eureka District.

RUBY HILL TUNNEL.—*Sentinel*, Feb. 6: The Ruby Hill tunnel is now in 1560 feet and is passing out of the hard formation it has been running in for a long time past. The air is good, being supplied from big crevices near the breast, which shows that the ground ahead is in a more broken condition and of a better nature for ore than has been encountered for some distance. A contract will be let as soon as the next 100 feet have been driven.

Hawthorne District.

CLAIMS BEING WORKED.—*Walker Lake Bulletin*, Jan. 28: The miners, manifesting their faith in the mines of Hawthorne, are working on various claims with increased vigor. The Good Hope, owned by Striker & Box, shows a strong vein of ore of fair grade. This mine is in close proximity to the Pamlico, and is claimed to be on the same belt of mineral. At present work is being done in running a tunnel to tap the ledge, which it is expected will be completed within a few days. The Consolidated shows fine ore. George Olsen is engaged in driving a tunnel on the ledge and extracting pay ore, though in small quantity. This claim is situated in Neversweat

gulch, and now shows itself as a bullion-producer. The New York is worked by lessees who have on the dump about 10 tons of good ore and are daily extracting more. The Pamlico has survived from the recent litigation decided in its favor, and is now working a force of 10 men extracting rich ore. The force will probably be increased in a short time. The Evening Star is also worked by Barlow & Longabaugh, who have a lease of the property, and are at work in the lower levels. They are reported as doing well. The Early Dawn is being worked by the owners, Kimball & Waddell, who have three men regularly employed drifting and stoping. They have been getting good ore all the time. The mine presents very flattering prospects of a big bonanza. The Gold Bir, owned by D. Tubino, has two men at work. There are rumors of a big lawsuit concerning the ownership of this claim. It must be, as it is, a valuable mine when such signs of war are afloat. The work of extending a tunnel on the vein is actively going on. The assessment work has been done on many other claims in the district. Badger Bill and Chas. Ganong have started up the Compromise mine. It is in a good locality and with work it will no doubt show up in time with other paying mines in the district. Tom Daly and John Hammond are at work on the North Star.

Jett District.

SENATOR.—Belmont *Courier*, Feb. 1: Assays of ore from the Senator mine, made by Geo. Nicholl on Wednesday last, resulted as follows: No. 1.—Silver per ton, 59½ ounces and 66 66-100 per cent lead. No. 2.—Silver per ton, 64 ounces and 69 21-100 per cent lead. No. 3.—Silver per ton, 73 ounces and 69 80-100 per cent lead. The Senator mine is situated in Nye county and is owned by Thos. Warburton of Belmont. The above assays show that Jett is one of the best silver and lead mining districts in this part of Nevada. There are large bodies of ore in the various mines of that district, and whenever a railroad is built through Smoky Valley the mines situated in the Toiyabe, Jefferson, Spanish Belt, Peavine and San Antonio mountains will come to the front as bullion-producers. Gold is also known to exist in all of the mountains above named, principally in the famous Ophir and Jefferson districts, Nye county.

Rosess River District.

THE CONTRACT LET.—Reese River *Reveille*, Feb. 7: The contract for timbering and sinking the Union shaft has been given to Tony Russell, Harry Harris, Joe Gill, John King, Ed Johnson and another party, whose name we did not learn. They are to receive \$450 for timbering the shaft and \$14 per foot for sinking the first fifty feet and \$14 for the following hundred. We were speaking with an old miner who worked in the Plymouth in 1862, who says "that he wished he had the money to purchase the mine, and run east from the bottom level, to strike the body of ore that pitched west from the North Star mine." This was M. J. Farrell's opinion also, who advised the sinking of the Plymouth. But the opinion of miners does not cut much of a figure with the present management.

Robinson District.

SINKING A SHAFT.—White Pine *News*, Feb. 1: The Robinson Canyon Consolidated Placer M. Co. have commenced sinking shaft No. 3 on the upper part of their ground. No. 2, prospected well, but they are determined to make a thorough test of all their ground before starting in to work with the view of production.

Tuscarora District.

PLACERS.—*Times-Review*, Feb. 8: There has been but little placer mining here, on account of the scarcity of water, for a number of years. Next spring, however, there will be plenty of moisture, and operations in that line will probably continue during the greater part of the summer. The placer diggings are all owned by Chinamen, and during favorable seasons they make good wages as long as the water holds out.

ARIZONA.

STRIKE.—Prescott *Miner*, Feb. 5: A strike of very rich sulphur ore is reported to have been made in the Senator recently. The Congress mill continues to run day and night, while work in the mine is being prosecuted with vigor. Owing to the recent storms and muddy roads, there are about 20 carloads of concentrates piled up in the mill, awaiting shipment. P. J. Fitzgerald made a clean-up yesterday, at the sampling works, on a lot of ore taken out of a Turkey creek mine. The result proved highly satisfactory. J. R. Liston left this morning for the Del Paso mill, in the Bradshaw mountains, which he is running successfully on ore from the Old Reliable mine. F. L. Carlisle, superintendent of the Black Horse mine, is running a double shift on the mine, and will soon have it in shape to commence sinking. The shaft in the Quartz Mountain mine is down 150 feet, and G. J. Wickler, a practical miner, recently employed there, says there is an abundance of fine milling ore in the shaft, which goes all the way from \$30 to \$150 per ton. J. C. Brown, of the company, will go out to the property to-morrow. J. D. Helm, superintendent of the Oro Bella M. Co., is in town. He has had a two months' run of the mill, which he says proved highly satisfactory. He is now engaged in building a tramway to the Grey Eagle mine, which was recently purchased by the Oro Bella Co. They intend to put in a chlorination plant at the Oro Bella mill, to work the base ore of the Grey Eagle mine, both that and the Oro Bella mines being rich in free gold also.

OLD DOMINION.—*Silver Belt*, Feb. 1: The new cages for the Old Dominion Co. arrived last week and have been put in place in the Interloper shaft. We understand that sinking is to be commenced at once. The present fine weather is very favorable to surface work, and has given the company opportunity to make several needed improvements. Coke has arrived in quantity during the past ten days, and there is not likely to be any interruption in smelting for some time to come.

GARFIELD.—Mobeave *Miner*, Feb. 8: Mr. Fisher has a lease on the Garfield and has a carload ready for shipment. A. E. Rogers and Juan Canos have commenced work on the Intic gold claim in Chloride. David Southwick is taking out good ore on the Buckeye. James Mitchell, who has had a lease on the Virginia, has a carload of good ore ready for shipment. The Rattan M. Co. have concluded not to purchase the quartz-mill of the Monarch M. Co. In the Music mountains mining affairs are at pres-

ent looking brighter than ever before, and a good deal of development is being done. E. F. Thompson is making a 50-ton shipment from his Empire No. 2, Chloride. John K. Mackenzie has struck a body of good ore in the Cincinnati mine, which he recently banded from W. H. Hardy. F. Byers and P. R. Washington have taken out 45 tons of ore from the three mines in that district. The district needs reduction works, so that the ore can be worked near the mines, and the prospects are at present favorable for them. It is authoritatively stated that active operations will be soon commenced on the Montezuma in San Francisco district. This mine is owned by New York capitalists. Supt. Bowers will commence work on the Night-hawk, Layne Springs, as soon as the necessary supplies can be got to the mine. Supt. Mackenzie has about 50 tons of ore ready for shipment from the Cupel. All the first-class accumulated since December has been worked, and gave results of from 260 to 338 ounces silver per ton, the whole averaging over 300 ounces per ton. There is a force of more than 20 men employed, and the product is about the usual quantity.

HARQUA HALLA SOLID.—The Bonanza mine is proving to be a really fine property. Its greatest depth is 140 feet, but in the absence of hoisting works drifting has only been prosecuted from the 60-foot level. Some 270 feet of stoping ground is now opened up, leaving, according to Foreman Tom Brown's estimate, 3000 tons of ore in sight. The pay streak varies from 5 to 12 feet in width, and the last millrun showed an average in the ore of \$30 per ton, free gold. Tom Cochrane is in charge of the Harrisburg mill. A cleanup from 14 days' operations yielded \$8500. Mr. Cochrane, who is in town, although a part owner, keeps his head, and will only admit, in a matter-of-fact way, that he considers the claim a "good property." It is doubtful if the Congress mine showed up better at the present development.

COLORADO.

STRIKE IN THE EXPRESS.—Aspen *Times*, Feb. 7: For several days rumors have been heard of an important strike in the Express mine at Ashcroft, which is being worked by the Express Mining Company, under the management of H. J. Russell. It has been impossible to secure accurate information regarding the developments that had given rise to these reports, but when Mr. McK. Robinson, who was formerly an owner in the property, was seen by the reporter, he stated that samples of ore had been brought down from the property within a few days which assayed ten ounces in silver and from 64 to 70 per cent in copper. The parties who brought the ore down stated that a very large body of it had been developed, and when they got the assay they declared that the discovery was nothing less than a bonanza. Ore of this character is worth in this market about \$120 per ton. Manager Murphy of the Edison reports that the property holds out fully as well as at any time since the recent discoveries were made in it. It is shipping from 25 to 30 tons of ore per day. This is not its full capacity, but the figure is one that can easily be maintained for an indefinite period. The Silver Bell has developed a new ore body at a point some distance below the workings from which the recent heavy shipments have been made. The newly-found vein is reported to be of even better grade than that which was taken out above. Some ore is being found in the Saddle Rock, which is under lease to John Scott and others, with M. Murphy as manager. The contact is just being opened, and it is showing a good streak of very good ore. The parties interested are satisfied that they will soon have a pay mine. The road on Aspen mountain is getting in such a bad condition that teams are no longer able to bring down more than three and a half tons at a load. With a good road they haul on an average from four and a half to five tons from Tourletto park.

IDAHO SPRINGS.—*News*, Feb. 7: During the month of January there were shipped from the station at this place 128 cars containing 3,665,000 pounds of ore, a decrease of only 19,000 pounds as compared with the shipments for December. An addition to be used in storing concentrates has been built to the Mixsell mill. On Monday water was turned into the flume, which was found to be in excellent shape. Mixsell hopes to be able to start the mill running the first of next week.

DAKOTA.

THE NEW HOPE LODE.—Deadwood *Pioneer*, Feb. 5: This is a promising location near the Standby—formerly known as the Little Rapid Lode—its high value consisting in the high-grade concentrates which it yields after the extraction of the free gold. It was experimented with by Prof. Carpenter during his geological survey, who informed the reporter that the concentrates would yield about \$25, and it requires about four tons of rock to make one of concentrates. It is a large, well-defined deposit of the class which he denominates "bedded." It is under bond to some of Rapid's scientific men, who hope to sell it for big money. The name of the lucky owner is Joe Walter.

CARBONATE.—Frank Bryant, superintendent of the Spanish R., is now sinking a shaft on the property. The mine looks remarkably well, and as some have said, promises a "bonanza." At the Iron Hill, Stewart Thompson is as busy, in fact more so than before the fire, getting ready for rebuilding. The debris is being removed as fast as possible, and lumber is arriving daily for the new structure. Seabury-Calkins are getting ready for extensive sinking and drifting, overhauling machinery, etc. Take it all in all, the camp has lost none of its vim on account of the fire.

IDAHO.

THE CINNABAR.—Clayton *Free Press*, Feb. 6: This mine was located by Kirk Bros., in 1881. Two shafts have been sunk on the ledge and the discovery shaft is sunk on the footwall to a depth of 330 feet, showing ore on three sides from top to bottom, and at the terminus of said shaft there is five feet of solid ore, going down, that assays \$28 in gold, 80 ounces silver and 30 per cent lead. It could not be worked farther on account of bad air. Out of this shaft over \$50,000 worth of ore has been shipped, as the receipts from the smelters show. At this point work was suspended. Going south on the surface about 600 feet, they have sunk a shaft on the footwall

of the ledge to a depth of 60 feet, which is designated as shaft No. 2. In this shaft a fine body of first-class ore is exposed all the way down. On the footwall the ore, which is first-class, is 2½ feet in width, and assays \$110 in gold, 90 ounces in silver, and 30 per cent lead. The receipts from the Clayton smelter corroborate the above statement in every particular. From the footwall to the hanging-wall, a distance of 60 feet, a crosscut is driven. On the hanging-wall a body of ore is exposed which is 4½ feet in width and assays \$70 in gold, 125 ounces in silver and 30 per cent lead. Between these bodies of high-grade ore, in the intervening space of 53 feet, is a solid body of concentrating ores; which, by reducing five tons to one, as near as can be ascertained, returns \$180 in gold, 225 ounces in silver, and 70 per cent lead. From this shaft first-class ore has been shipped to the amount of \$15,000. The developments produced by shafts Nos. 1 and 2, proving conclusively the immensity of the ore deposits, induced the operators to drive a tunnel 500 feet to tap shaft No. 1. All the ores exposed to view in this mine are free from base; the gangue being carbonate of iron, makes it a valuable smelting proposition. On the dumps are from 7000 to 10,000 tons of concentrating ores, and about 150 tons of first-class ore. On this location there is abundance of fine timber, and the water in the creek is sufficient for milling and smelting purposes; thus making it an easy task to treat the concentrating ores at comparatively little cost, say from \$1.50 to \$2 per ton. This valuable property is destined for a bright future, and will rank with the Granite and Comstock. It is owned by a Highland, Ill., and a St. Louis, Mo., company.

CRESUS.—Ketchum *Keystone*, Feb. 8: The fine development made in the Cresus mine near Hailey, some three weeks ago, is proving very satisfactory, and the ore taken from the new find is improving in quality.

PELICAN.—We have it from good authority that Messrs. Lord & Gard have made a good development in the Pelican mine, located about a mile north of the noted North Star mine on East Fork. These miners have been working their claims a long time, and deserve to be rewarded for their untiring perseverance.

STAR OF HOPE.—Hugh Fraser came in from the Star of Hope mine on the Lost river divide on Thursday. He and the Ross brothers have been working that mine during the winter. He reports the mine looking well and producing good ore. The snow is from ten to twelve feet deep on the level at their place.

LOWER CALIFORNIA.

PLACERS AND QUARTZ.—*Lower Californian*, Feb. 6: It is the intention of the Lower California Mining Co. at the Real del Castillo to employ 100 men constantly at their mines, and to operate 15 quartz ledges besides the placers.

HYDRAULIC MINING.—"It will be Mexico's first attempt at hydraulic mining on a large scale," remarked Col. T. Masac, President of the Lower California Mining Co. "Our sluice-boxes are now being rapidly put in place at Rich Gulch. This \$40,000 flume we have been some months building is a combined aqueduct and ditch four and one-half miles in length. The grade is seven and three-quarters feet to every hundred feet, making a uniform pressure. The capacity of the flume is 600 miners' inches. Our longest trestle is 1700 feet, with a depth of 35 feet. There are five in all and they have consumed over 100,000 feet of Oregon pine and redwood. The sluice-boxes will be secured with Yale locks, and three different people will have keys, which, used together, will alone open the combination. As soon as the placer work is well under way, I shall put a large force of men on the quartz ledges, where we have 15 veins to develop. There are some excellent prospects waiting."

MONTANA.

THE SILVER CROWN.—*New Northwest*, Feb. 7: Certainly the best showing of any prospect in Oro Fino, the amount of development considered, is that made by the Silver Crown. The shaft has reached a depth of nearly 70 feet, having followed the vein on an incline. At the start but four inches of ore showed up in the vein. This has now widened to 18 inches of solid, high-grade ore. Thomas Strang made a number of assays this week of samples taken from across the lead, which gave the following returns: No. 1, \$686.71; No. 2, \$661.86; No. 3, \$233.30; No. 4, \$186.66; No. 5, \$131.90. As the ore has steadily increased in quality as well as in quantity, with depth, and as the formation is solid and unbroken, the Silver Crown can conservatively be numbered among the best prospects in the district. So far as we are advised, no such showing of high-grade ore at equal depth has ever been made in the camp.

THE OHIO.—The most important mining event of the week is the strike in the Ohio. At a depth of 150 feet a crosscut to the south was started. This had been run a distance of 47 feet last Monday when the vein was encountered and cut six feet to the wall. Of the six feet of vein matter, nearly four feet is solid ore ranging in value from 70 to 80 ounces to the ton, according to numerous and careful assays. The strike occasioned considerable stir among mining men.

GRANITE MOUNTAIN.—Phillipsburg *Mail*, Feb. 6: The output for the week ending Feb. 6th was 48 bars of bullion containing 72,455 ounces fine silver and 158 ounces fine gold.

THE SIMPSON.—The Simpson lode, about two miles south of Rumsey, is likely to prove to be a bonanza. The vein is about four feet wide and lays in the granite and porphyry, and runs high in silver and carries some gold. This new find is owned by John Berry and M. Gerberg.

THE SOUTHERN CROSS.—Salton Cameron of the Southern Cross reports his mill as running in excellent shape and the ore from the Southern Cross as being richer than ever.

EMIGRANT GULCH.—Emigrant gulch, Park county, is rather quieter this winter than usual, and most of the miners who for a number of years past have resided here are enjoying winter quarters in Chico, while the more transient of the population have gone to winter elsewhere. But little work is being done in the gulch, but the miners still hold the claims to which they have pinned their faith so long, and have an abiding confidence in the ultimate prosperity of the camp. Their hopes are well founded and the coming season promises to witness a veritable

boom for this camp, as the rich character of her ores are becoming known abroad and capital is beginning to be placed in the more prominent claims here by outsiders. It is confidently expected that a plant for reduction of ore will be built at the opening of the coming season, and Emigrant promises before long to rank equal with the richest of Montana's mining camps.

NEW MEXICO.

SIERRA CO.—Kingston *Shaft*, Feb. 8: The mining outlook for Sierra county never was better than at present. Every district in the county shows renewed activity. Hillsboro, Chloride, Lake Valley, Hermosa, and Kingston are all producing steadily. Hillsboro is probably working a larger force of men than at any time since the district was discovered. The Silver M. Co. of Lake Valley are working 115 men, which, considering the vast amount of machinery, does the work of 400 men. At Hillsboro and Chloride the number of hands employed in the mines is steadily being increased. During the past week the mines at Hillsboro have experienced considerable difficulty in securing miners to do the work. It is patent to the observer that the mines of the Kingston district will, within a short time, largely increase their working force.

THE ECLIPSE.—This mine is looking more than sanguine, and Mr. Renchler, the superintendent, is well pleased with the present outlook. Yesterday he unexpectedly struck a 2-foot vein of ore lying horizontally. Upon assay he discovered that six inches lying between the lime and shale returned a value of 300 ounces silver.

THE BONANZA-GOOD HOPE.—This mine, which has made a good record as a producer during the past year, and owned by the Animas Peak Mining Co., has been transferred to the Bonanza-Good Hope M. Co., lately incorporated under the laws of New Mexico.

TO BEDROCK.—John Belcher and Mike Falvey are sinking a shaft on Flapjack Hill, that famous producer of nuggets and shot gold. They are sinking this shaft through the contact with the purpose of striking the original bedrock, which has never been tested.

EL ORO.—This mine is in Dutch Gulch, six miles north of Hillsboro; and development is being pushed upon it with vigor. The new forty-horse power hoister is now in position, and the main working shaft has reached a depth of 110 feet. It is expected that this shaft will cut the vein any day.

OREGON.

SPARTA.—Cor. Bedrock *Democrat*, Feb. 6: The little Pittsburg mill will fire up soon. The extension mine of the Old Gem, owned by Jack Davis, is now down 70 feet, showing a well defined 20-inch pay streak the entire distance. The Union tunnel, being run to develop the Gray Eagle and Union mines, owned by Clough and Reed, is being pushed rapidly by Al. Waldron, contractor. Dr. Marotte and brother undoubtedly have the bonanza mine of Eastern Oregon. In the face of their 300-foot tunnel they have three feet of \$25 free gold ore, and in the winze at the 260-foot station, they have four feet of \$40 free gold ore, and over 100 feet of ore in their stopes.

CORNUCOPIA.—In regard to the outlook of the mines of Cornucopia district, Mr. Robert Kelly says: "The people of the Pine Creek mines are more hopeful that a number of mining sales will be made this summer than they have ever before been. From a careful noting of the camp I find 26 mines that, as far as work has been done on them, give almost positive evidence of becoming dividend-paying properties. And there are a legion of other mines that are in that indefinite condition that it would be too risky to predict their future, but doubtless a reasonable per cent of them will also prove to be paying mines. This number of mines that have every prospect of becoming dividend-paying properties will be considered as an over-estimate by the majority of mining men, but the failing has been that experts in coming to examine the mines have remained but a few days, while it would take with laborious exertion at least two weeks to examine the district."

EAST EAGLE CREEK MINES.—That your readers may form some idea of the extent and richness of this camp, I will say that the Sheep Rock, Bradley, Faithful Boy, Mint and several other properties are sufficiently developed to show well defined true fissures of sufficient value to warrant the early construction of a plant with double the capacity of the Sanger mill, and ore enough above the water level to run her day and night for years.

UTAH.

PARK NOTES.—*Record*, Feb. 8: Last Monday the Nevada-Northland leasers caused an injunction to be served on the May Flower No. 7 leasers to restrain them from taking ore out of the Northland ground pending an adjustment of the difficulties existing between them. The owners of the Gopher claim, located just below the Woodside, are about completing a sale of a portion of their property to Colorado capitalists, who will provide the wherewith to fully develop their promising ground. Sinking the incline shaft on the Creole No. 2 still continues. The shaft is now down over 100 feet. The vein has, within the past week, changed its dip, and is now going into the hill almost perpendicularly. The indications are looking much better as depth is attained, and the leasers look for the pay streak to open out in good proportions at any time. D. F. Condon has given a year's lease on the east half of the Creole mining claim at a royalty of 30 per cent. This lease puts the Creole on top as regards the amount of royalty being received by any claim-owner in the camp, as there are two sets of leasers now operating on this single claim—one on the west and one on the east half—each paying a 30 per cent royalty, which gives the owner the unprecedented amount of 60 per cent of the claim's net output.

ORE AND BULLION SHIPMENTS.—The Ontario bullion shipment for the week was 30 bars, containing 18,026.68 fine ounces of silver. Gitsch and Campbell, leasers of the upper workings of the Crescent mine, shipped 48,375 pounds first-class ore this week. During the week the Mackintosh sampler received and forwarded 261,730 pounds of Mayflower, 27,690 pounds of Woodside, 300,770 pounds of Ontario, and 89,250 pounds of Daly.

MECHANICAL PROGRESS.

The Progress of Invention.

The earliest and simplest forms of bronzes ax with which we are acquainted are profoundly interesting, as casting a flood of light upon the general process of human evolution all the world over. Every new human invention is always at first directly modeled upon the other similar products which have preceded it. There is no really new thing under the sun. For example, the earliest English railway carriages were built on the model of the old stage-coach, only that three stage-coaches, as it were, were telescoped together, side by side—the very first here the significant motto, *Trium juncti in uno*—and it was this preconception of the English coach-builder that has hampered us ever since with our hateful "compartments," instead of the commodious and comfortable open American saloon carriages.

So, too, the earliest firearms were modeled on the atack of the old cross-bow, and the earliest earthenware pots and pans were shaped like the still more primitive gourds and calabashes. It need not surprise us, therefore, to find that the earliest metal axes of which we have any knowledge were directly modeled on the original shape of the stone tomahawk. Such a copper hatchet, cast in a mold, formed by a polished neolithic stone celt, was found in the early Etruscan tombs, and is still preserved in the museum at Berlin. See how natural this process would be. For, in the first place, the primitive workman, knowing already only one form of ax, the stone tomahawk, would naturally reproduce it in the new material, without thinking what improvement in shape and design this malleability and fusibility of the metal would render possible or easy. But more than that, the idea of coating the polished stone ax with plastic clay, and thereby making a mold for the molten metal, would be so very simple that even the neolithic savage, already accustomed to the manufacture of coarse pottery upon natural shapes, could hardly fail to think of it. As a matter of fact, he did not think of it; for celts of bronze or copper, cast in molds made from stone hatchets, have been found in Cyprus by General di Cesnola, on the site of Troy by Dr. Schliemann, and in many other assorted localities by less distinguished but equally trustworthy archaeologists.

To the neolithic hunter, herdsman, and villager, this progress from the stone to the metal ax probably seemed at first a mere substitution of an easier for a more difficult material. He little knew whither his discovery tended. It was pure human laziness that urged the change. How nice to save yourself all that long trouble of chipping and polishing, with ceaseless toil, in favor of a stone which you could melt at one go and pour while hot into a ready-made mold! It must have looked, by comparison, like weapon-making by magic; for properly to out and polish a stone ax is the work of weeks and weeks of elbow grease. Yet here, in a moment, a better hatchet could be turned out all finished.

But the implied effects lay deeper far than the neolithic hunter could ever have imagined. The bronze ax was the beginning of civilization; it brought the steam engine, the telephone, woman's rights and the county councillor directly in its train. With the eye of faith, had he only possessed that useful optical organ, the stone-age artisan might doubtless have beheld soap and the deceased wife's sister looming dimly in the remote future. Till that moment human life had been almost stationary; thenceforth it proceeded by leaps and bounds, like a kangaroo society, on its upward path toward triumphant democracy and the penny post. The nineteenth century and all its wiles hung by a thread upon the success of his melting-pot. —*Cornhill Magazine*.

The Plate-Glass Industry.

The development of the American plate-glass industry within a very few years has been very rapid and successful, so much so in fact that the home product has driven the foreign out of the market. The demand for this class of goods has also increased of late, stimulated no doubt by the low price at which it has been offered, and which is still sufficiently high to make its manufacture profitable, and all the factories in this country turning out plate-glass are now driven to their uttermost capacity. Noting the growing prosperity of this industry, and influenced by its future prospects, there seems to be a plan developing by capitalists to go into its manufacture more extensively. It is also reported that one at least of the English companies, which are no longer able to do a paying business in exporting their product, has decided to come to America and put in a plant to compete with those already established here.

The employment of foreign capital in this country, not only in establishing new, but in the purchase of plants already established, has been a subject which has been pretty freely discussed through the press, and in many cases has been carried to an extent that has caused those not thoroughly acquainted with the facts and conditions thus brought about to have some apprehensions of evil results, and to form exaggerated ideas of the extent and capacity of these foreign investors.

As a matter of fact, however, there is not

the slightest ground for any uneasiness, and not only this, but we are inclined to think that it may be a possible benefit to the country in certain ways not yet fully appreciated by those who are so bitterly opposed to foreign capital investments. There is only one thing to be feared, and that seems hardly probable at the present time, and that is the possibility that this country may declare for free trade.

In connection with the manufacture of plate glass, the establishment here of an English concern would only tend to reduce the price to the consumer and consequently decrease the profit to the manufacturers, but this would come as heavily on the foreigners as upon us. We have all the advantages that they have. If they come here they are obliged to use the materials at hand, which are as readily obtained by their competitors, so that it is merely a matter of competition between producers, with decided advantages in favor of local plants.

MOVEMENT OF THE IRON CENTER.—There appears to be every indication that Pittsburgh will soon cease to be the great center of iron production in this country. Alabama seems to be rapidly coming to the front. The following statistics are quite noticeable in this connection. Alabama now has 44 blast furnaces and eight buildings, against 24 completed and 19 building in November, 1887. In Pennsylvania there are now but 230 active furnaces, against 242 in condition to make pig iron two years ago. The capacity of Alabama furnaces in November, 1887, was 423,000 net tons, against 1,277,000 net tons November last year. In Pennsylvania, November, 1887, capacity was 5,073,988 tons, against 5,733,588 November, 1889.

THE BRIQUETTE MAKING INDUSTRY is rapidly gaining ground in Europe. In and about Halle, in 1875, there were only 25 presses in operation turning out the produce of 250 tons of small coal. Now, in 1890, there are 65 works, with 186 presses, which will use up some 2,500,000 tons. Twenty-two additional presses have just been put in operation, making a total of 208. A large quantity of lignite briquettes are now being imported from Austria-Hungary. This industry is not making as rapid progress in this country as its merits and profits would seem to require.

ELECTRIC DOORS.—The Tremont theater, Boston, is now fitted with electric doors, which can be opened by simply touching one of eight push-buttons situated in convenient places in the theater. On the slightest alarm 17 eels of folding doors are immediately and simultaneously thrown open by the electric circuit, doing away, in a large measure, with the danger of being trampled to death in cases of panic.

THE LONGEST LIGHT CIRCUIT.—An incandescent light company at Ottawa is now working a circuit 45 miles in length. This is believed to be the longest incandescent circuit in the world, and it is questionable whether it is approached by an arc circuit. It is certainly a remarkable instance of flexibility of system and of the delivery of the electrical current at an extremely remote point.

TWO USES OF COMMON SALT.—Among the many uses of common salt may be mentioned two which admit of frequent application. Salt put in water which surrounds the ordinary glue-pot causes a hotter glue to be obtained than where simple water is used. Salt in the water where mason-work is being done in cold weather prevents disintegration by frost.

ELECTRICITY FROM THE WIND.—The storage battery harnessed to the windmill is sure to become of great service in driving the machinery of future generations. Before very long more attention will have to be given to the yoking of the winds, waves and tides to the driving-shafts of our industrial works to supplement the storage reservoirs of the coal mines.

MACHINES FOR PACKING MATCHES have recently been tried with encouraging results. One machine, the invention of two young Norwegian engineers, has a packing capacity of 1000 boxes per minute. Ingenious machines for the various operations in the match manufacture have been in use in Scandinavia for some time, and more are expected.

RIGIDITY IN BRIDGE WORK.—The gradual failure of a cast-iron bridge erected about 45 years ago at Potsdam, Pa., has been the cause of considerable scientific inquiry. The conclusion arrived at is that the bridge members were too rigidly connected, no adequate allowance being made for effects of varying temperature.

A DURABLE JOINT, and one that will be permanent, can, it is said, be made between rough cast-iron surfaces by the use of mineral ashes mixed with sufficient white lead to make a very stiff putty. This will resist any amount of heat, and is unaffected by steam or water.

COMPARATIVE COST.—The hydrocarbon process of treating iron so that it will not corrode is said to cost less than one-half of that of galvanizing, while the durability, under similar conditions, is considerably extended.

SCIENTIFIC PROGRESS.

Air in Water.

The *Locomotive* says that the purest water often is the most active in corroding and pitting plates, and this makes it probable that the active substance, in some cases at least, is air. It is well known that water is capable of dissolving a considerable amount of air; in fact, it is this dissolved air that enables fish to breathe. It is not so widely known, however, that the oxygen of the air is more soluble than the nitrogen. If a small quantity of water be shaken up in a bottle, it dissolves some of the enclosed air, and when this is afterward driven off by boiling and analyzed, it is found to consist of oxygen and nitrogen in the proportion of 1 to 1.87, instead of 1 to 4, as in the natural air. Thus the dissolved air, being more than twice as rich in oxygen as common air is, and being brought into more intimate contact with the metal by means of the water that holds it in solution, exerts a correspondingly more noticeable effect.

It is probable, too, that water plays some other important action in connection with the oxidation of metals, for it has been found by recent experiments that pure oxygen will not combine with things that it has the greatest affinity for, provided it is perfectly dry. Even the metal sodium, which has an intense affinity for oxygen, may be heated in it to a very high temperature without combination, provided sufficient precautions are taken to exclude the slightest trace of moisture. It appears, therefore, that water plays a most important part in the oxidation of metals by air—a part, indeed, that we cannot explain, and that we really know but little about.

In this connection we would recall a fact which seems of late to have been largely lost sight of, but which was fully proven to be a fact some 25 years ago—to the effect that a person may descend in a diving-bell without any air-tube and remain thus submerged for hours, without receiving any air from the surface—the needed air being supplied by repeated jets of water distributed through the chamber of the bell by means of a very fine sprinkler connected by a pipe and cut-off cock with the outside sea-water. The water thus introduced in a fine spray, parted with the air which it always holds in solution, in quantities sufficient to meet all the wants of the occupants of the bell. It also absorbed or washed away the carbonic acid gas generated by the breaths of the occupants. The water was introduced at intervals of 10 or 12 minutes, and was allowed to spray for some two minutes at each interval. The query was that so small a quantity of water was required. It was then supposed that the air thus enclosed contained only the same proportion of oxygen as was found in the ordinary atmosphere. The experiments above recorded furnish a solution of the query. About that time a submarine boat was also constructed and navigated under water, as an experiment, the occupants supplying themselves with air in the same way as did the occupants of the diving-bell. All later submarine boats have been supplied with condensed air. We have seen no reference to any further experiments of such a nature for the last 20 years or more. Has their knowledge been forgotten or overlooked by engineers, or are they considered unsuited for practical application?

The Bee's Sting a Useful Tool.

A new champion has arisen to defend the honey bee from the obloquy under which it has always rested. Mr. William F. Clarke of Canada claims to have discovered from repeated observations that the most important function of the bee's sting is not stinging. In a recent article he says: "My observations and reflections have convinced me that the most important office of the bee sting is that which is performed in doing the artistic cell work, capping the comb, and infusing the formic acid, by means of which honey receives its keeping qualities. As I said at Detroit, the sting is really a skillfully-contrived little trowel, with which the bee finishes off and caps the cells when they are filled brimful of honey. This explains why honey extracted before it is capped over does not keep well. The formic acid has not been injected into it. This is done in the very act of putting the last touches on the cell work. As the little plant trowel is worked to and fro with such dexterity, the darts, of which there are two, pierce the plastic cell surface and leave the neoteric beneath its tiny drops of the fluid which makes it keep well. This is the 'art preservative' of honey. A most wonderful provision of nature, truly! Herein we see that the sting and the poison bag, with which so many of us would like to dispense, are essential to the storage of our coveted product, and that without them the beautiful comb honey of commerce would be a thing unknown."

If these things are so, how mistaken those people are who suppose the bee is, like the prince of evil, always going about prowling in search of a victim. The fact is that the bee attends to its own business very diligently, and has no time to waste in unnecessary quarrels. A bee is like a farmer working with a fork in his hay-field. He is fully occupied and very busy. If molested or meddled with, he will be very apt to defend himself with the instrument he is working with. This is what the bee does; and man, by means of his knowledge of the nature and habits of this wonderful little insect, is enabled, in most cases, to ward off or evade attack. —*Scientific American*.

The Latest from Edison.

A recent telegraphic dispatch to the *Chronicle* describes a new device just announced by Mr. Edison, which consists of a combination of the phonograph and camera by which a speaker, in full action and gesticulation before the combined instrument, may have his speech conveyed by the phonograph, while the camera conveys his bodily presence, action and gesticulation to a distant quarter, where it is reproduced and shown upon a screen. The idea was suggested to Mr. Edison that if a rifle-bullet could be so photographed as to show the bullet as it at rest in its swift passage, with the condensation of air in its front, a vacuum behind and air eddies in its course, it would be possible to photograph a speaker as many times in a second as would be required to keep him in all his motions directly before the eyes of an audience, the successive photographs being conveyed, as rapidly as produced, upon a distant screen. The close of the dispatch reads as follows:

He thought that if a speaker's personality could be brought before the eye by means of photography and a stereopticon while the phonograph was bringing the subject-matter before the ear, an important end would be gained, and to accomplish this, experiments were planned and carried out.

The result has been a marvelous success. Imagine a popular lecturer, preacher or orator delivering an address. In front of him, at a so-called reporter's table, are two small machines, one the well-known phonograph and the other an ingenious piece of mechanism by which photographs of the speaker are taken in succession with enormous rapidity at intervals of from one-eighth to one-twentieth of a second.

And suppose both of these machines are at work silently recording both the uttered speech and the personal appearance of the speaker. The results thus obtained may be sent to any desired point and thrown on a screen by an ingeniously contrived piece of mechanism. Thus the exact appearance of a speaker, with all his gestures and plays of features, are exactly reproduced, while the phonograph simultaneously delivers his speech.

The interval between successive photographs is so infinitesimal that even the picture is an apparently living one, moving, gesticulating and uttering words in fact spoken by the phonograph. The greatest difficulty experienced by Edison in his experiments was the synchronization of the two instruments so that the utterance of the phonograph should exactly coincide with the gesticulation, but this was finally overcome and the experiments were crowned with the most perfect success.

Edison is not pushing the matter at present, being absorbed in his experiments on electrical traction for street cars. When that problem is decided he may bring this new invention prominently before the public.

SULPHATE OF COPPER.—Dr. Farnies of Paris has recently been making some curious experiments with sulphate of copper, which he has announced to his colleagues of the Academy of Medicine. The hands of a young woman, on whom the experiments have been made, became not merely wrinkled and cracked after being immersed in a solution of sulphate of copper, but swelled out in a peculiar fashion. Though her sense of touch remained unimpaired, the flesh became insensible to the pricks of a needle or the cuts of any sharp instrument. Dr. Farnies' experiments also proved once again that salts of copper do not possess the poisonous properties formerly attributed to them. This advance of science can scarcely benefit the herborist Moreaux, who was guillotined for having poisoned his wife with the salts in question.

THE TELEPHONE.—We have cited several instances in these columns where the telephone and telegraph have been quite fully foreshadowed many years ago. Perhaps there is no more remarkable case than the following: In 1667 Robert Hooke of London described how he transmitted sound by means of a wire to considerable distances. Wheatstone described his "telephone" as early as 1821, and in 1854 Ch. Boreson said: "Suppose a man speaks near a movable disk, sufficiently pliable to lose none of the vibrations of the voice, that this disk alternately makes and breaks the currents from an electric battery, you may have at any distance another disk which will simultaneously execute the same vibrations. It is certain that in a more or less distant future, speech will be transmitted by electricity."

THE MODERN IDEA OF A DRAGON quite closely agrees with a prehistoric animal which has recently been found by Professor Marsh in a fossil condition in the upper cretaceous deposits, along the eastern slope of the Rocky mountains. The larger skeletons, as found in parts, indicate the former existence of an animal larger than any now found living—the skull being over eight feet in length. A striking feature of the skull is its armature, which consisted of a sharp beak in front, a strong horn on the nose, a pair of very long pointed horns on top of the head, and a row of sharp projections around the margin of the posterior orbit. The animal must have been not only a horrible-looking but a most powerful creature.

A VEGETABLE FLANNEL is made in Germany of fine leaves, which are spun, knitted and woven into undergarments, etc.

GOOD HEALTH.

A Labor Fallacy.

Notwithstanding frequent assertions to the contrary, physical toil is far more wearing and wasting to the human system than the same amount of mental exertion.

In the discussion of the eight-hour system of labor, it is an argument of the capitalists that mental labor is much more exhaustive than physical labor. The responsibilities that attach to positions of trust, the stress of the mental strain, the care and anxieties and vexation involved, are all magnified by the opponents of the eight-hour system. Their aim is to prove that mental laborers have a much harder time of it now than the manual workers, and hence that their demand for the reduction of the hours of labor is an unjust one.

But it is indubitably proven by experience that there is nothing so onerous and, in fact, unendurable to men as hard, physical labor. It is the one unmixed evil which all men try to escape. Pure physical exertion, without any mixture of mental effort, is painful and distasteful to everybody. No man will dig a hole in the ground for the fun of the thing. There is no sport in picking rocks or digging sewers. Work is pleasant when it is mixed with brains, and all other kinds of work are a burden.

Congenial mental labor, on the other hand, is delightful. A man who has found such congenial work is assured of a lifetime of pleasant and absorbing occupation. If such a man works too hard, it is simply because he is so infatuated with his work that his enthusiasm gets the better of his judgment.

Responsibilities which attach to positions of trust are much exaggerated. Responsibilities never much worry a man who is competent to fill the position he occupies. They add a zest and spice, and give inspiration to his work. For such a man there are no crushingly heavy responsibilities.

This statement that mental labor is as hard or harder than physical labor is a fallacy that is disproved by the universal experience of mankind.—*Boston Globe*.

OUR HOUSES AND FATAL "COLDS."—An Englishman's house is his castle, and when we approach it in a spirit of criticism, we enter upon dangerous ground, says the *Decorator's Gazette*. We do not doubt, nevertheless, that many of the "colds" which have been fatal have been caught at home, and have been due to a style of domestic architecture, ventilation and warming, which are adapted neither to heat nor cold, and are equally incapable of resisting either. A well-lighted staircase, with gas-burners on the different landings, with a wide chimney under the front door, and surrounded by rooms with good fire and badly fitted doors and windows, is as ingenious an apparatus as could be contrived for subjecting the inhabitants to all the evils which vicissitudes of climate can produce. A person who goes out of doors feels that he is about to encounter something, and braces himself in a manner which renders the assault comparatively harmless. A person who comes from a drawing-room to a staircase has not this feeling, and steps into a cold bath without warning or forethought. The difference is one of high importance, because a chill for which the system is unprepared drives back the blood from the surface upon the internal organs, and may inflict upon them sudden and serious injury; whereas, when the chill is expected, the heart is ready to assist it, and to maintain the circulation with corresponding increase of force. The path of safety lies in the avoidance of great contrasts, in such arrangement of stoves and fireplaces as may produce an approach to equality of temperature in the house, in the substitution of intended and properly placed inlets for the present system of crevice ventilation, and in the management of these inlets so that the entering air may be warmed when warming is expedient. The truth of these matters, simple though they are, and almost as easy as it may seem to insist upon them, involves the issues of life and death to many of the most useful and most valued members of the community.

FAINTING.—If it were not a serious matter, nothing could be more amusing to the experienced physician than the conduct of the average layman when a person may have fainted. Nine times out of ten the anxious spectator will seize the head of the unfortunate, elevate it, and rush for water with which to sprinkle the prostrate patient. What should one do? Why, remain perfectly cool, and instead of raising the head of the patient, do just the opposite—lower it and elevate the rest of the body. Fainting, or syncope, as it is called in medical works, is a temporary failure of the heart by which the brain is deprived of its arterial blood. So by lowering the head and elevating the rest of the body, the arterial blood, by the force of gravity, is sent to the brain, and recovery is almost instantaneous.

REMEDY FOR PERSPIRING FEET.—For feet that perspire and with a disagreeable odor, the following is said to be an excellent remedy: To a pail of cold water add about a teaspoonful of permanganate of potassium, bathe the feet in this two or three times a day, changing the socks each time, and put some boracic acid (powdered) into the socks and hoots before putting them on.

USEFUL INFORMATION.

MANUFACTURE OF JAPANESE LACQUER.—The manufacture of Japanese lacquer has until lately been quite an enigma. But Mr. Romyne Hitchcock described recently to the Washington Chemical Society the manner in which this lacquer and the beautiful Wakasa ware are prepared. Lacquer is obtained from a tree, *Rhus Vernicifera*, which grows throughout the main island of Japan, but is best around Kioto. The juices from which lacquer is obtained exude from horizontal cuts in the bark, and is collected from May to October. It exudes slowly, and is collected with a pointed instrument like a spoon, and transferred to a wooden receptacle. A dozen trees are cut in several places in rapid succession, and the juice collected from time to time. During the season each tree is visited about 20 times. As the sap first exudes it is a grayish-white thick or viscous fluid, which quickly turns to yellow, and afterward to black, when it is in contact with the air. It is strained through a cotton cloth to free it from wood and dirt, being first thoroughly stirred to make it of uniform consistency. A portion of the raw lacquer, usually about 16 pounds, is then poured into a large circular vessel and vigorously stirred with a long-handled implement for five or six hours, while the heat of a small charcoal furnace is ingeniously thrown on the surface to evaporate the water. During the stirring, certain ingredients may be added. Thus, iron is added to produce the fine black lacquer. In Tokio, a soluble salt of iron is used for this purpose; in Osaka, a fine iron dust. The lacquer is then poured into a vessel to settle, and is afterward drawn off from the sediment.

COCONUT BUTTER.—In the last Consular report published by the State Department there is an interesting account by Charles Monaghan, of Mannheim, of coconut butter, a fatty substitute for butter which is now displacing oleomargarine and genuine butter in Germany. The practicability of making a substitute for butter from the meat of the coconut was discovered by Dr. Schlunk, chemist of Ludwigshafen. It has been manufactured for a year at Mannheim. The daily production is 3000 kilograms of butter, which sells at from 13 cents to 15½ cents per pound. With real butter at from 25 cents to 35 cents a pound, the coconut imitation grows rapidly in the public estimation. It is of a clear color and agreeable to the taste. The poor use it on their tables in place of the genuine article, but those able to be fastidious use it chiefly for cooking purposes. It is free from the acids so often found in real butter, and is more wholesome. As it is free from the suspicion that attends butter made from the milk of cows affected with tuberculosis, it is much to be preferred to some kinds of butter in the market.—*Baltimore Sun*.

WHY THEY DO IT.—Every one has noticed that builders as soon as they put in the glass, especially in the lower story of structures, dash a large quantity of whitening upon the inner side of the glass. To most observers the act is no doubt regarded as a very silly thing to do, but such is not the case. There is a good reason for the act. A Chicago reporter recently interviewed a contractor on this point and received the following explanation: "We have to mark them that way or they'd be smashed in no time. You see, the workmen around a new building get in the custom of shoving lumber, etc., through the open sash before the glass is put in. They would continue to do it even after the glass is in if we didn't do something to attract their attention. That's the reason you always see new windows daubed with glaring white marks. Even if a careless workman does start to shove a stick of timber through a costly plate of glass, he will stop short when his eye catches the danger sign. That white mark is just a signal which says, 'Look out; you'll break me if you are not careful.'"

THE MILK PIPE COMPANY, which has recently been formed in New York with a capital of \$600,000, will most likely be soon put under way. The milk is not piped as a fluid in the pipe, as was first supposed, but inclosed in large cylindrical cans, surrounded by water, which propels them. The system is ingeniously worked out, and seems to have elements of promise in it. It is claimed by the company that it will be able to deliver milk in New York from a distance of 100 miles for one cent per gallon freight.

ABSENCE OF FISH IN THE YELLOWSTONE PARK.—Although the Yellowstone Park is full of springs and streams, they contain no fish. This is explained by the abundance of lava, which obliterated life when it was forced out, and has since kept the fishes out by the fact that the lava has produced a waterfall in every stream.

TEAKWOOD A PRESERVATIVE OF IRON.—It is said that there is a great increase in the consumption of African teakwood, on account of its property of preserving from rust iron or steel that is in contact with it.

GERMANY'S floating exhibition will visit 80 ports on its world's trip. It is a much grander affair than our "California on Wheels."

In Sweden a new elevator loads a 2500-ton vessel with iron ore in a day.

ELECTRICITY.

What is Electricity?

No one ever saw a current of electricity, and to the ignorant it is an intangible something which we know exists all around us, and which, if we don't take care, will shock or even kill us. What do we know about it? Next to nothing! How, then, asks the *American Machinist*, can we deal with a force we know nothing about? Science is systematized knowledge; the science of electricity is systematized facts regarding its manifestations under different conditions. From these facts certain laws have been deduced, and by properly comprehending and applying them, we are enabled to bring, in a measure, electric force under the control of man. For all practical purposes, a current of electricity (we have to deal almost exclusively with electricity as a current) may be considered as a mode of motion, a force which, when transmitted through appropriate apparatus, will do work, mechanical and chemical—evidenced as heat, light and power.

It is somewhat difficult to comprehend an intangible force; the power to do work by the aid of steam from a boiler or by a suspended weight, or coiled spring can readily be understood. We see, so to speak, the power, and we know we can supply it, but with electricity it is different. A dynamo-electric machine at rest is simply a mass of iron and wire. Where does the power come from to produce such marvellous results? A steam boiler consumes coal in its furnace, heats the water and makes steam. The spring and weight must be wound up and energy expended. Here we have the analogy. To generate currents we must expend energy; we must use steam through a steam engine to obtain the power to operate the dynamo. But why should the rotation of the armature of the dynamo generate electricity? No one knows! All we know is that such is the fact, and that for a given expenditure of energy—coal, steam engine, energy—we get back a certain percentage of electric energy in the form of a current. The proportion of conversion of dynamic into electric energy depends upon the construction of the transmitting machine—just as some steam engines will give a higher efficiency for a given expenditure of steam than others.

Electricity is merely a mode of motion; but there can be no motion without a previous expenditure of energy of some sort. The energy expended is the power of the steam engine. It rotates the dynamo and sets the electric current in motion. The current can never have the same power to do work as the steam engine, as a certain amount of energy is wasted in transmission, making itself evident as heat. To make this plain—suppose a 10-horse power engine is used to drive a dynamo, and the electrical efficiency of the dynamo is 85 per cent—that is, for an expenditure of 10-horse power of dynamic energy, we have a return of 8.5-horse power of electrical energy, 1.5-horse power being lost in transmission through the apparatus.

Electrical Tanning.

Since the days when Adam made his first leather sandals, the process of tanning appears to have been carried on as if no art was required. The truth is that the work is so comparatively simple that a man from the plow with a few days' instruction would pass muster as a tanner. And so the trade has been content to jog along, being fortified by the practical truth of the fact that "There's nothing like leather." Not but what there have been attempts to improve the process of tanning, notably by the aid of chemistry, but the results appear to have come out the wrong way for both the inventor and the trade. The exclusiveness of the tanner has, however, been successfully intruded upon by that latest development of science—electricity. This successful intrusion has been effected by the electrical tanning process of L. A. Groth of London, which our London contemporary *Iron* recently inspected in operation at the tannery of Tehbit Brothers, Bermondsey.

In order to realize the benefits this new process promises to confer on the trade, we may observe, says *Iron*, that ordinarily the green hides are steeped successively in pits containing tanning liquor of varying quality, weak at first, but gradually increasing in strength. This steeping process occupies, on the whole, from three to four months, and requires a large number of pits. By the aid of Mr. Groth's process, however, the time required for steeping has been reduced from months to weeks.

The apparatus used in the new system is very simple, consisting only of a circular tank within which is a framework of wood on which the hides to be tanned are stretched. The tank is filled with tan liquor, which is kept warm, and the frame with the hides is caused to revolve at a moderate speed to keep up the necessary agitation. In the ordinary system this agitation is performed at intervals by hand. A current of electricity is conducted to the tank, the two poles from the dynamo entering it from opposite sides. By means of internal conductors the current is passed through the tanning liquor, and acting upon the hides, the process of tanning is greatly quickened. The time occupied in treating the hides is two weeks, as against the three or four months occupied in the ordinary process. The great saving in time effected by the new process is due

to the circumstances that electricity facilitates the union which takes place between the tannin of the bark and the gelatine of the hide during tanning.

The new process has been in use with one set of apparatus (which is said to take the place of from 30 to 40 ordinary pits) at Tehbit's tannery for about 12 months. The results of working give every satisfaction, and lead to the conclusion that the great aim of the tanner—which is to get the largest outturns possible at the lowest cost and in the shortest time—can now be realized beyond his anticipations.—*Ex.*

ELECTRICITY IN MINING.—One of the greatest aids that electric power has of late been called upon to enter is that of mining, remarks the *Electrical World*. The use of the electric light in mines is not new, and possibly its success has helped create the demand that has sprung up for power appliances. Be that as it may, there can be no doubt as to the reality and extent of the demand, and vast as are the fields already opened up for the electric motor, it may seriously be questioned whether the opportunities in mining, the latest sphere of its occupation, do not surpass all others. We believe that 1890 is destined to be the conspicuous year as the starting-point of electric mining on the grand scale, as 1889 was for electric railroading. One cheering feature in connection with the new departure we have thus distinguished is the hearty welcome accorded the new power by the mining journals, mining experts, and the mining world in general. There has been at once an absence of prejudice and a keen appreciation of the advantages that electricity can give, and it now depends upon electrical inventors and electrical engineers to rise to the occasion and reap the rewards that await ready ingenuity and honest work. They may form some idea of the immensity of the field from the fact that the value of American mining products in 1888 exceeded \$590,000,000, and during the past year the industry has been no less prosperous. It is the province of electricity not only to aid in the economical and safe production of this great wealth, but to bring up to the point of remunerative productivity hundreds of mines that are worthless under other conditions.

AN ELECTRIC ALARM COMPASS.—An alarm compass, the invention of a Boston man, sounds an alarm if the vessel is allowed to get off her course. Electricity is brought into play to accomplish this.

ENGINEERING NOTES.

ECONOMY VS. SPEED.—The tendency in Atlantic steamers has for a long time been to sacrifice economy to speed; but a new departure is indicated in one of the new boats of the Hamburg-American line, the *Scandia*, which uses only 58 tons of coal a day. In very good weather she can make 14½ knots an hour. Allowing for an average of little less than 13 knots an hour, or say 290 knots a day, she can travel five miles on one ton of coal, and her cargo space enables her to carry 4000 tons of freight, so that with one pound of coal she can carry a ton of freight ten miles. Probably this has never been surpassed in point of economy, and still less equaled.

TO BRIDGE THE BOSPHORUS.—The latest engineering scheme is a bridge for the straits of Bosphorus, by which direct railroad communication will be made between Europe and Asia. The plan comprises nothing less than the construction of a colossal bridge 872 yards long over the historic and picturesque channel that flows between the shores of Europe and Asia. It is stated by the Paris correspondent of the *London Telegraph* that the French engineers who are thinking of undertaking the construction of the bridge would make it with one arch only. This done, there will be no more need of the Leander-like or Byronic swimming across this historic channel.

THE NIAGARA FALLS PRIZE.—A device for utilizing the power of Niagara Falls, invented by a Chicago engineer, has been awarded the gold medal offered by the Buffalo International Fair for the best invention for this purpose. The device consists of an overshot wheel 60 feet in diameter, to be mounted behind the falling sheet of water, and moved by proper machinery toward or away from the waterfall as the power is needed. The wheel is to drive dynamos by friction-clutch connections, and the power will be transmitted by wire to any desired place. There were over 150 competitors for the prize.

ENGINEERING PROGRESS.—Within the next ten years, some of the grandest pieces of engineering ever conceived will be started. Bridge building has commenced which, if talked of now, would be regarded as chimerical. Houses 15 to 20 stories high will be built. Tunnels are to be built under cities. Pneumatic tubes will be constructed to carry passengers three miles per minute. These schemes all exist in the minds of engineers, and are being worked out into practical shape.

TEXAN HARBOR IMPROVEMENTS are to be pushed at the Washington end. Senator Coke has already introduced a bill asking for \$6,000,000 for Galveston. Bills have also been prepared by the friends of the Corpus Christi project.



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Passing Events.

The mines which were closed down during the recent stormy weather are gradually resuming operations and putting the men to work again. Most of the roads in the mountains, however, are still in bad condition, making it hard for hauling ore or supplies.

The big mill at the Stonewall mine, San Diego county, belonging to Governor Waterman, has been completed and is the heat in Southern California.

The sale of the Mountain mine, Sierra county, to English capitalists is a good thing for that section. The old Sierra Buttes mine, on the opposite side of the Buttes, and owned by an English company, was the mainstay of that region for many years. English mining investors usually put up good works and give steady employment to many men.

Railroad men are still busy clearing their tracks, repairing bridges and filling washouts, employing large numbers of laborers. The loss of so many bridges all over the coast will keep the bridge-makers busy the coming season.

LATEST ADVICES from South Africa state that at Johannesburg a wonderful strike of quicksilver has been made. It is eight or ten feet from the surface, with every indication of going down. No discovery of greater importance to the gold industry could be made, and the greatest interest is being aroused. The entire gold product of South Africa in 1889 was \$9,000,000.

Influences on Silver.

The decline in silver is a source of surprise to many bimetallicists, but so far as we can learn, it does not discourage them in their efforts toward securing free coinage from our Government. A tabulated compilation of the lowest and highest prices by years, for 20 years past, in the London market, does not warrant the least degree of uneasiness as to the final outcome, owing to prices showing a marked advance over about one year ago. The table as given by the *Iron Age* is as follows:

Year.	Lowest.	Highest.	Average.
1870.....	60½	60½	60 9-16
1871.....	60 3-16	61	60 5-16
1872.....	60 1-16	61½	60 5-16
1873.....	60 1-16	61½	60 5-16
1874.....	60 1-16	61½	60 5-16
1875.....	60 1-16	61½	60 5-16
1876.....	60 1-16	61½	60 5-16
1877.....	60 1-16	61½	60 5-16
1878.....	60 1-16	61½	60 5-16
1879.....	60 1-16	61½	60 5-16
1880.....	60 1-16	61½	60 5-16
1881.....	60 1-16	61½	60 5-16
1882.....	60 1-16	61½	60 5-16
1883.....	60 1-16	61½	60 5-16
1884.....	60 1-16	61½	60 5-16
1885.....	60 1-16	61½	60 5-16
1886.....	60 1-16	61½	60 5-16
1887.....	60 1-16	61½	60 5-16
1888.....	60 1-16	61½	60 5-16
1889.....	60 1-16	61½	60 5-16

The new year opened at 44½ per ounce of 925 fine, steadily advanced until on Jan. 27th the quotations came through at 44½; since then the price has declined until it is to-day 43½.

The strength of the market in last year was based on several influences—First: Renewed agitation the world over in favor of bimetallicism. Second: Enlarged requirements from India—reaching a little over the equivalent of \$30,045,000 against nearly \$20,000,000 in 1888. Third: The English Chancellor of Exchequer buying silver for coinage so as to make payments in that currency as far as possible to employees. Fourth: The French Government coining some, chiefly for one of its colonies. Fifth: The impression that the present administration in this country would redeem its pledge by legislating in favor of silver. Sixth: Toward the close of the year, by reports abroad that the Bank of England would issue £1 notes against silver coin or bullion, the demand for which would outstrip that for the higher denomination.

The influences this year to depress silver are, as far as obtainable, as follows: First: The Russian Government again entering the market as a borrower, which may possibly cause the trouble to again become speculative and taken in lieu of silver by the Germans, English and French having dealings with Russians. Second: A growing impression that the administration in our country is opposed to the remonetizing of silver or to any bill looking to the raising of the metal from a commercial commodity. Third: Confirmed advices denying that the Bank of England would issue £1 notes against silver held by it. How such a report as the bank preparing to issue the notes gained credence is hard to say, for the institution could only do so by Act of Parliament; but it can retain part of its reserve in silver, and not all gold, as it now does.

The bimetallicists have the strongest fight to make against monopolists and heavy speculators whose moneyed power admits of their reaching out in all directions to prevent the remonetizing of silver. It is an open secret that all successful deals are worked through money manipulation, for a scarcity of coin puts it within the control of a few to unduly inflate or depress the prices for any speculative commodity. J. K. Armour's most successful corners have been worked in this way; so have many stock and other speculative movements at the East and also abroad. What do unscrupulous, moneyed speculators care for the debtor or any other class as long as they can, by making money scarce or plentiful, coin money through successful speculative movement? As hearing to some extent on the above, we give the following from the *London Weekly Bulletin*:

Many people think the present position of gold as serious, and it may be so. At any rate it is certain that a 6 per cent rate has failed to bring money into the country, and we doubt if even a 7 per cent rate would do much better. The fact is that our banking laws are all founded upon gold, and the entire community is at the mercy of a few individuals. If Rothschilds, Barings, and a few other big firms chose to-day to combine and draw a couple of millions from the Bank of England, what a "quilt" there would be! The 1866 panic would not be in it. Yet they could do it to-morrow if they liked. We would not care to have speculative

accounts for the rise open anywhere at the moment. Bulls or bears are dealing not on intrinsic values, but simply on influx or efflux of the precious metal.

The Industrial Situation.

During the last two months of 1889 and the first one of this year, there has been more or less of an industrial depression on this coast. The long-continued and severe storms prevented nearly all outdoor work. In the country scarcely anything could be done for weeks and weeks. Then came snow blockades, freshets, the washing away of bridges, and impassable roads, all of which put a stop to transportation by rail or by road. As a result, laboring men have suffered more or less by reason of lack of work. In the cities, the carpenters, painters, brickmasons and builders have had little or nothing to do; and others who earn their living outdoors, such as expressmen, sewer and cable-road builders, street laborers, etc., have been idle for a long period. The end of the great storm brought a short period of good weather, which, however, has not lasted long enough to bring about any activity in the lines mentioned.

Building operations in the city came practically to a standstill, and this was also the case in some other departments of trade. The foundries have been working short-handed by reason of lack of orders due to the weather and the roads. Very little machinery has been shipped from here of late for these reasons.

Now that the "back" of the winter has been broken, these conditions will speedily change. As the days lengthen, building operations will start up afresh and all business will show renewed activity. The necessary repairs to railroads, the building of new bridges, etc., will give employment to many men for months to come. Mining operations here and in Nevada are being resumed as facilities for ore transportation are again obtainable.

Those engaged in agricultural pursuits look for a prosperous season to come. The miners also are hopeful. There will be an abundance of water everywhere for power, and while there is temporary inconvenience from surplus water now, the final result will be beneficial. We will all have to make up for time lost this winter, so that all branches of trade and business must soon be pushed actively.

Gold in Suspension.

In crushing "refractory" gold ores, as a rule, the portions of the ore containing the largest quantity of mineral are by far the most brittle. Large quantities of "slimes" are made especially with ores holding metallic sulphides in large lumps, owing to the crystalline and friable structure of such metallic bodies, the valuable metal is apt to be very finely divided after crushing. Minute metallic grains will be found in this pulp under the microscope. Florence O'Driscoll, in his "Notes on the Treatment of Gold Ores," says this can be demonstrated in this way:

Put a piece of mineralized ore into an ordinary mortar and give it a few blows and turn it with a pestle; the result will be a few lumps of ore and gangue, a proportion of sand-like size, and also a quantity of fine dust. Throw half of this into a long glass test tube; a large proportion of the stones and metal will sink to the bottom at once, the sand will settle slowly, the dust very slowly, and in most cases the water will be discolored; this discoloration is caused by particles of mineral held in suspension in the water, and too minute to be discerned by the eye.

Then the other half of the ore can be treated in the mortar to sizes common in the treatment of gold ore, say to pass a 40-mesh screen; then throw these crushings into another test-tube and observe the result. Most frequently the water will be highly discolored, and remain so for days, and the crushings will find their way to the bottom, according to their relative weights, which, broadly speaking, is more governed by size than density. If this discolored water be poured off and allowed time to settle, the sediment would give a far higher return of metal than the coarser parts of the ore, which fall to the bottom quickly. Such sediments form the "slimes."

THE estimated consumption of copper in the United States last year was 75,500 tons.

Mineral Lands and Railroads.

The people in Montana are having the same kind of trouble about mineral lands on railroad grants that we are having here. But the miners there have handed together to fight for their interests and rights, while here the contests have been made by individuals. The railroad company has been victorious in California, and the recent Eagle-Bird decision has virtually given it large tracts of mineral land, which it was probably not the intention of Congress that the company should have.

The miners, prospectors, and mine-owners of Montana have taken the matter in hand as a body to prevent the loss of millions of acres of the best mineral land in that State. A Mineral Land Association has been formed, the officers of which keep a close watch on the movements of the railroad company, and are bringing the attention of Congress to the evils likely to result from the railroads getting possession of the tracts of mineral land.

Mr. Merrill, the secretary of the association referred to, in a letter to a locator states that there is actual danger of the Northern Pacific Co. securing title to several valuable mineral tracts. In this letter he says: "The section you refer to has been selected and certified for patent to the N. P. R. R. Co. by the United States land office at Helena. These patents have been withheld from this railroad company for two years by the efforts of the mineral-land convention of Montana through its executive committee, and the only hope now of saving these lands to the people of Montana as mineral lands is the work of the Mineral-Land Association of Montana to secure necessary action from Congress and the reserving forever all the mineral that is or may be found in all this mineral land."

It is to be hoped that the California delegation in Congress will be active in aiding the Montana men in having this subject thoroughly ventilated. The Government intended to reserve the mineral land from railroad grants, whatever the technical language of the Act may say. Congress should give the subject immediate attention, as it is of the highest importance to the mining industry.

Drift Mines and the Laws.

In the upper mining counties petitions are being circulated praying for an amendment to the Stewart bill which will enable companies owning drift mines to expend the amount of money required for annual work on a claim at one point when two or more claims are consolidated, instead of upon each location. In these drift mines very long tunnels have to be run, as the gravel beds are under the lava-capped "divides," or ridges. The making of these tunnels is a matter of very great expense, and if only small tracts of gravel could be worked by each tunnel, it would not pay to run them. The companies generally own several claims, and the work to develop them all is done on the tunnel itself. A number of claim-owners working together may develop paying properties, but if money must each year be spent on each location, it will work a hardship.

In fact the laws as at present framed, and those proposed, rather ignore the drift-mining industry. The conditions surrounding its development differ from those concerning quartz or hydraulic mines. The drift miners of California have, however, called the attention of Senator Stewart and other Pacific Coast representatives to their needs, and it is probable that their petition will have weight and be properly considered.

Reopening a Caved Mine.

In the Tilly Foster mine, Putnam Co., N. Y., they sank on the ore body from the surface to the 165 foot level, leaving ore pillars to support the hanging-wall, the vein being over 100 feet wide and the overhang in places nearly 50 feet. The pillars gave way and the top caved. They had then to strip the ground right down to the 165-foot level at all points. In some parts of the mine, where the greatest width of ore body occurs, as shown in the cut, the stripping must go even deeper. Some idea of the length and breadth of the lower ore pillars in this mine may be obtained by reference to the cut (see page 109). The new hanging-wall slope varies from a vertical position to an inclination of one foot horizontal or six feet vertical.

The Pump and Its Cussedness.

The holler feed-pump is a good deal like a man's heart; there is not much of it, but it is very important that it be in perfect condition, because if anything happens to that, the power stops, the machine is out of service. There is this further thing about the feed pump, though, that whereas the stoppage of the pumping action of a man's heart wrecks only the machine to which it is connected, the stoppage of a feed-pump may cause damage to neighboring people and property.

The pump is like a man's heart in another thing; it is liable to get "withering" at times, making short or long strokes, or seeming to be forcing wind, or to be knocking too hard, from some slight derangement perhaps not readily placed. Such tricks are annoying, and if let go too long may be dangerous.

There is this further analogy between the pump and the heart: That the cause of the trouble is generally about as hard to determine by inspection in the one as in the other. The working parts are less exposed to view or open to inspection in these two pumps, the one of muscle and the other of iron, than in the other machines and apparatus with which they connect.

If a man's stomach is out of order, the thing gives some indication; if his throat is affected, it can be inspected; but the heart has to be doctored from hearsay evidence and by feeling. So, while the boiler and the engine can be quite well inspected and repaired, the pump generally has a lot of hidden parts and passages, the inside of which no one has ever seen and no one will ever see so long as the machine is running.

Of course when the human machine is put in the scrap-heap, any one who knows how to dissect may tell what was the matter with the pump that it did not run right. Sometimes these lessons are of use when some other human blood pump gets to pounding; but as a general thing the doctors and engineers are in the dark about most of the trouble with the two feed pumps, the one of muscle, and the one of iron.

This makes it all the more desirable that whoever has charge of a pump of any kind, especially if it be used to feed a steam boiler or to do any other duty where much depends upon its effective and continuous action, should very carefully study the action of his own and other pumps, so that the moment anything happens he will be able to know, first, what is wrong; second, what would be the result if it be allowed to continue; and third, when and how to cure the trouble.

You may find old engineers who never have any trouble setting their engine valves, but who will send for the pump-doctor the moment anything commences to knock, or slip, or give any sign of doing anything different from what it ought to be.

You will find an engineer who has been working on one job, where there is a certain make of pump, commences asking questions the minute he strikes a run where the pump is different; and as a general thing he will get down there on the first Sunday, if he takes charge of the plant (and sometimes upon the Sunday before), and take things down and do some regular old-fashioned thinking.

Once in a while you will find some very fresh young man, or some old "know-it-all," who will not think it necessary to find out anything more than where the throttle and the drips are; but a good man, who feels that he has his own life in his hand, and with it the lives and property of others, and the livelihood of his children—such a man is not taking any risks nor getting in any more holes than he can help about "the heart of the engine-room"—the pump.

There is one snag, however, against which whoever loquies into the action of pumps runs early in his tramp for knowledge in this connection; there is but very little literature upon the subject. He cannot book-up in this line as

he can in other departments of his business. He can buy countless books upon the steam engine—some good, some bad, many indifferent, and the same way about the boiler—but when it comes to pumps, there is very little to be

ning. This leaves a common experience upon the floor of societies where candidates are being examined as to their competency for admission to membership. If the questioning gets to running in the direction of pumps, the candi-

out of hours those of the neighbors who know less about pumps than he does, and who yet do not care to "give themselves away" by sending for the regular pump-doctor, who will send in a bill to the firm.

A Coil Boiler.

On this page are out of a coil boiler, of the type used in modern torpedo and steam launches where high speed is desired. By means of a pump, water is forced through the boiler, which consists of a series of pipes so placed and connected as to form, practically, one continuous length of tube, into the upper and cooler portion of which water is admitted, and from the lower and hotter portion of which the steam is led away. Steam is led from the lowest set of tubes to the "separator," which allows the steam and water coming from the boiler to divide—the latter, of course, collecting in the bottom. This bottom is connected with the pumps so that when necessary the excess of water can be returned to the boiler.

The boiler generates steam only as it is needed and utilized by the engine, the only reserve or surplus steam being that contained in the separator, the lower sets of tubes, and in the connecting pipes. This form of boiler is, of course, a very rapid generator of steam, and is thus especially adapted for very fast yachts and torpedo boats such as the Herreshoff Bros. build and send all over the world.

Blue Canyon in Winter.

We give on this page a view, made direct from a photograph by Taber, of a snow scene up in the Sierras during the recent snow blockade on the Central Pacific Railroad. The scene is at Blue Canyon, at which point the first of the snow-sheds is encountered on the way East. Beyond the figure of the man is seen the snow which has been shoveled back from the track, and on this side the snow-bank through which the rotary plow and the shovelers had to cut a way for the trains. Blue Canyon is a small settlement, and one may see from the view how little chance the people had to get about during the storm. The snow has not yet gone, by any means, although the railroad is open. The people in the mountain towns have had a surfeit of snow this year, and will be glad to see the ground around their houses once more.

ROLLED STEEL BEAMS.—At the meeting of the Board of New City Hall Commissioners, a communication was received from John Wright, Peter H. Jackson and August Leon, the committee selected at a previous meeting to report on the comparative cost of built steel-plate girders instead of rolled steel beams of equal bearing. They informed the board that after a careful examination of plans on Contract 17 for constructing a portion of the steel-work on the northeast wing, they had concluded that a built-up girder of equal strength to the 24-inch rolled steel beams would involve an additional expense of 20 per cent. Steel beams of the required kind cannot be obtained in this city.

OZOCERITE.—During 1889, the product of ozocerite or "mineral wax," from the Utah mines was approximately 130,000 pounds, as compared with 65,000 pounds in 1888. The foreign market has been greatly excited on account of the absorption by English hospitalists of the greater part of the Galician deposits. Within the last six months of the year the price of the material has advanced. Ozocerite is a mineral wax composed of 85 per cent carbon and 15 per cent hydrogen and is extensively used in the arts.

THE BOARD OF REGENTS of the State University has appropriated the sum of \$100 to be added to a donation of \$200, given by the American Association for the Advancement of Science, for the purchase of a spectroscope for the Lick Observatory.

WATER WHEELS, windlasses, derricks, sluices, etc., are found on the beach at Crescent City, indicating loss to the miners on the Upper Klamath or Trinity rivers by the recent high waters.

THE GOVERNOR has appointed Wm. S. Wood of this city a trustee of the State Mining Bureau, vice W. T. Garratt, deceased.

AUGUSTUS PETTIBONE, Sup't and general manager of the Standard Consolidated mine, died at Bodie on Monday.

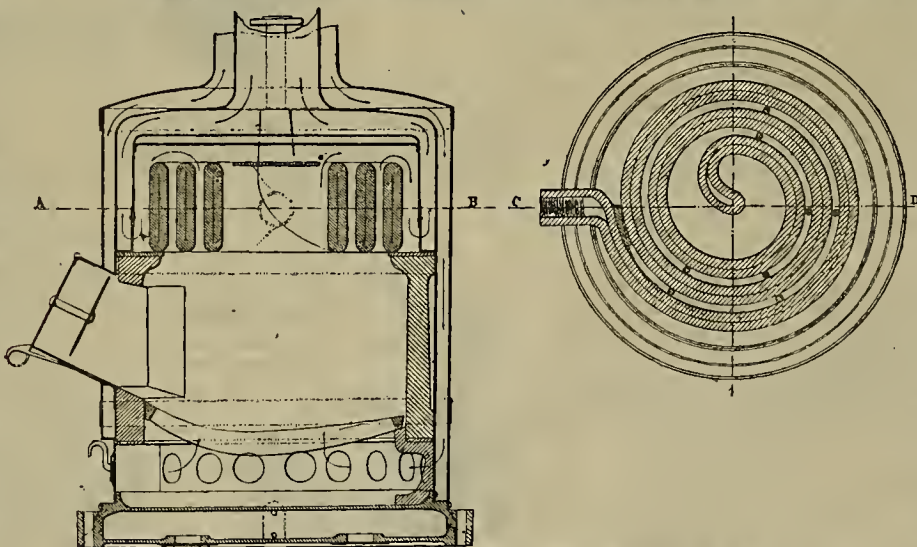


SCENE AT BLUE CANYON, ON THE CENTRAL PACIFIC R. R.

found in the papers upon the subject, and very much less bound up in book-shape.

So far as we know, there are but two books published upon pumps—one of them by an Englishman, and intended for those who are designing pumps; the other by an American and

date is uniformly found to fall in a large proportion, and in fact it is matter of common knowledge that a man may be very readily rejected for utter ignorance, if those who are examining him know where he has run and what kind of pumps he has had. If he knows only



COIL BOILER FOR FAST YACHTS AND TORPEDO BOATS.

meant for those who are setting up and running them; and both of these have been put upon the market within the last two years.

We often find a man who has been running plants where they had certain kinds of pumps, get stuck when he moves into another State and has to be examined for a license. He will get along all right and swimmingly as long as the engine and boiler are the subjects of examination; but when it comes to the pump, he gets stalled the minute he is asked about some other one than those which he has been run-

the Knowles, the Dow and the Deane, he can be floored by asking about the Worthington, the Hooker and the Davidson, and so on.

Let each one of our readers make up his mind that his present or next job may depend upon his knowing thoroughly not only those pumps which he has under his charge, but all the other principal ones upon the market.

With such knowledge as this a man may not only feel himself much more valuable under fire of an examining committee, but earn a good many extra dollars at odd times, helping

A Mistake in Identity.

EDITORS PRESS:—The paragraph in your paper of February 8th, referring to the death of John J. Dorsey, and his connection with the Maryland mine of Grass Valley, is totally incorrect.

The fact of Sam'l P. Dorsey's name having been on your subscription-books since your first issue, should have prevented the mistake in identity, and also the comments upon the management of the Maryland mine. SAM'L P. DORSEY.
Grass Valley, Feb. 10th.

[We are very glad indeed that the paragraph referred to was incorrect, although there were others in San Francisco who labored under the same impression. No "comments" upon the management of the mine were intended. It was said it had never been properly opened or developed, by which was meant that no large capital had taken in hand and equipped the mine in a first-class way, for we had understood some time since from Mr. Dorsey himself that he was desirous of aid in that direction for that purpose.—EDS. PRESS]

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by tending their influence and encouraging favors. We intend to send none but worthy men.

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E. E. DERRICK—Oregon.
CHAS. M. MOODY—Oregon.
H. G. PARSONS—Washington.

THE *Homer Index* is responsible for this: An enterprising individual made a mining location in Lake canyon recently, and at one end planted a pole in a snowdrift 50 feet deep. The other end he could not get to, but seeing a coyote sitting on a shelf of rock about the right distance off, he took him for the north lode line monument, which fact he stated in the notice that he posted on the pole. The animal will, of course, stay there, and see that no one jumps the claim.

THE January pay-rolls of the Comstock mines amounted to \$158,107.

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Preface; Introduction; Implementos; Assay Balance; Materials; The Assay; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scorching; Cupellation; Weighing the Bead; Fasting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

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NOTICE is hereby given that, at a meeting of the Board of Directors, held on the 21st day of January, 1890, an Assessment, No. 16, of Four (4) Cents per share was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin, to the Secretary, at the office of the Company, Room 11, No. 303 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the Twenty-fifth (25th) day of February, 1890, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 17th day of March, 1890, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

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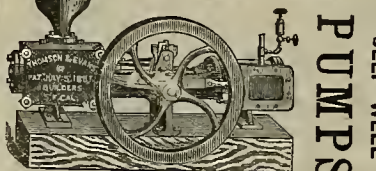
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Individual Property Rights.

Webster defines socialism as "a social state in which there is a community of property among all the citizens." It is not in the line of our present purpose to give any special attention to the various theories that belong to this general class. Though widely different in some respects, they all have a family likeness. They all aim at the same thing, the destruction of individual property rights. That private property is robbery is the general slogan. When we remember the fate of the Zares, the New Harmonies, Brooke Farms, Oakdales and various phalanxes that have been tried, we have increased respect for the rights of private property, and however much we would like to see change and reform in the present order of things, we do not care for a millennium that has to be sponsored by a sort of hothouse process.

"History," says Carlyle, "is philosophy teaching by example," and it is only by the light of experience that we can thrir our way through an untraveled wilderness. Now it is a world-wide experience that civilization advances only so far as the right of private ownership is respected and secured. Adam Smith once made the remark that the security afforded to property in England had more than overbalanced all the faults and blunders of the Government. And there cannot be the shadow of a doubt that the wonderful growth and prosperity of the United States is owing to the safeguards that have been thrown around the sacredness of property. Even the Government will not take a shovelful of soil from any owner without rendering a just compensation. On the other hand, just in proportion as property is insecure, has been the tendency to barbarism. This fact is so obvious that it would be a waste of time to attempt to prove it, and yet we have a lot of charlatans in political economy that would burn the patent office, the courthouse and Hall of Records, upset the Civil Code and our whole system of jurisprudence, get into a covered wagon and move back to the woods.

Then all history teaches that only so far as a man is certain to enjoy the fruits of his toil will there be any stimulus to production, thrift and enterprise. In all parts of the world where property is liable to be seized by some petty tyrant or roaming freebooter, production, trade and commerce are found to exist only in the rudest and most primitive condition. Henry George's theory of the Governmental ownership of the land is already in force in some parts of Asia and Africa, and what is the result? Why, there is no fixed property only of the rudest kind. Valuables are hid in the earth or carried away to places of safety. We refer to Henry George at this point for the reason that his single-tax merely masks under a plausible veil of rhetoric a scheme for the confiscation of all private property in land. He says in the opening of Chapter III, Book VII, of "Progress and Poverty":

The truth is, and from this truth there can be no escape, that there is, and can be, no just title to an exclusive possession of the soil, and that private property in land is a bold, bare, enormous wrong, like that of chattel slavery.

And further on in the same chapter:

And by the time the people of any such country as England and the United States are sufficiently aroused to the injustice and disadvantages of individual ownership of land to induce them to attempt its nationalization, they will be sufficiently aroused to nationalize it in a much more direct and easy way than by purchase. They will not trouble themselves about compensating the proprietors of land.

Now this means a forcible seizure and robbery. Nationalization may have a softer sound, but it means the same thing, and our ethics teaches us it is just as bad for a Government to steal as the individual. It is true that the fertile fancy of the writer evolves a very pretty Utopia as brilliant and evanescent as the paradise of the opium-eater. Whenever the ideal millennium comes, if it ever does, and all men love their neighbors as well as themselves, there will be little use for law and government; but as long as self-interest is the mainspring of action, and it is likely to be till human nature undergoes a radical change, it will be necessary to define and protect individual right to property.

THE Virginia Chronicle says: "The daily ore yield of Comstock mines is now up to the normal average of 1000 tons, and by March 1st will exceed that amount. The hullion product of that quantity of ore does not fall short of \$20,000, aggregating \$600,000 monthly, and the yield of the lode of the current year is expected to exceed \$3,000,000."

THE old Con. Virginia shaft and the Hale and Norcross shaft on the Comstock are not in very good working order, owing to the steady movement of the ground, and men are at work repairing them to admit of the free movement of the cages up and down the shafts.

AGENTS of Lord Francis Godolphin Osborne of Glengora, Berkshire, England, have purchased a group of mines on the San Pedro river, near Dudleyville, Arizona, for the sum of \$500,000.

CHILI exported last year 23,500 tons of fine copper.

List of U.S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

FOR WEEK ENDING JAN. 28, 1890.

420,227.—DEVICE FOR SWINGING SLIDING SASHES.—S. R. Deacon, Los Angeles, Cal.
420,424.—ORE-FEEDER.—P. Hinkle, S. F.
420,425.—SASH BALANCE.—Benj. Marshall, S. F.
420,427.—SUGAR CANE SLICER.—J. N. S. Williams, Honolulu, H. I.
420,161.—HOLDBACK FOR VEHICLES.—W. G. Lansing, S. F.

FOR WEEK ENDING FEB. 4, 1890.

420,489.—GATE.—J. W. Bain, Gonzales, Cal.
420,530.—MITER-BOX.—F. V. Carman, Oakland, Cal.
420,532.—DENTAL PLUGGER.—H. Craigie, S. F.
420,439.—HINGE FOR WINDOW-SASHES.—G. D. Crocker, Oakland, Cal.
420,678.—DEVICE FOR TRANSMITTING MOTION.—J. W. Eisenhuth, S. F.
420,512.—THRASHER.—B. Holt, Stockton, Cal.
420,600.—LATCH AND LOCK.—H. O. Hooper, Eureka, Cal.
420,725.—LIFTING GOODS FROM SHELVES.—J. H. Jeffrey, Crescent City, Cal.
420,626.—DYNAMITE.—E. Judson, S. F.
420,806.—FRUIT-PITTER.—A. A. Kent, San Jose, Cal.

420,907.—FRUIT-PITTER.—A. A. Kent, San Jose, Cal.
420,559.—PORTABLE ASH-BASKET.—Elizabeth J. Lincoln, S. F.
420,560.—CHART STANO.—Fannie L. Matson, San Jose, Cal.
420,561.—DRAW-HEAD FOR CARS.—C. & R. McAfee, Portland, Ogn.

420,914.—TUNING PIN FOR PIANOS.—H. Muller, S. F.

420,519.—CALENDAR CLOCK.—P. F. Nilsoo, Phoenix, A. T.

420,542.—VENTILATOR AND CENTER-PIECE FOR CEILINGS.—D. O'Leary, S. F.

420,550.—CABLE DEPRESSING MECHANISM.—F. G. Stillman, S. F.

420,841.—PERMUTATION LOCK.—Ada H. Van Pelt, Oakland, Cal.

420,752.—COLLAR FOR PAN DRIVERS.—T. A. Washburn, Gold Hill, Nev.

420,484.—INSTRUMENT FOR COPYING DRAWINGS.—R. W. Whitney, S. F.

420,755.—APPLIANCE FOR SPINNING TOPS.—F. E. Williams, Alhambra, Cal.

420,648.—INSULATING COMPOUND.—J. B. Williams, S. F.

The following brief list by telegraph, for Feb. 11, will appear more complete on receipt of mail advices:

California.—William P. Walling, Santa Monica, elevated carrier; Peter H. Flynn, Los Angeles, safety-bolt for whiffletrees; George E. Foster, McPherson, check-book for barbers.

Notes.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

CALENDAR CLOCK.—Peter F. Nilsoo, Phoenix, Arizona. No. 420,519. Dated Feb. 4, 1890. This invention relates to the class of automatic calendars and especially to that class used in connection with clock mechanism. It consists in fixed guides or supports on which are mounted separate calendar cards or tags, springs tending to force said cards or tags forward, and oppositely reciprocating guard-plates operated by the clock for holding the cards or tags upon the guides, and relieving them in such a way that one shall be forced off the track every 24 hours.

DENTAL PLUGGER.—Henry Craigie, S. F. No. 420,532. Dated Feb. 4, 1890. The patent covers certain constructions and combinations in the class of dental pluggers.

GATE.—John W. Bain, Gonzales, Monterey Co., Cal. No. 420,489. Dated Feb. 4, 1890. This is an automatic farm-gate arranged with a different mechanism from those in common use.

THRASHING MACHINE.—Benjamin Holt, Stockton. No. 420,512. Dated Feb. 4, 1890. This improvement in thrashing machines consists in the application to the shaft of a thrashing machine of a frictional clutch mechanism intermediate between the cylinder shaft and the driving gear with its frictional surfaces normally held together, so that in case of any sudden stoppage or check in the motion of the cylinder, this intermediate clutch will slip sufficiently to relieve the driving gears and prevent their breaking.

MITER-BOX.—Frank V. Carman, Oakland. No. 420,530. Dated Feb. 4, 1890. This is one of that class of miter-boxes in which a swinging leaf, adapted to receive and guide the saw, is employed, said leaf being vertically adjustable to receive different thicknesses of work and adapted to be fixed at any suitable angle to make the cut desired. The patent covers the peculiar construction and combination of parts.

LATCH AND LOCK COMBINED.—Henry O. Hooper, Eureka, Humboldt county, Cal. No. 420,600. Dated Feb. 4, 1890. This invention is especially designed to combine a door-lock and latch in one article. It consists of a hollow spindle to which the door-knobs are at-

tached, said spindle having a projection upon one side which engages the latch-bolt so as to withdraw it when the door is to be opened, and in combination therewith of a spirally threaded shaft lying within the hollow spindle and engaging a point or projection within it, so that when the shaft is rotated it is caused to travel longitudinally within the spindle. This movement is effected by means of a key of any desired construction, which is introduced into the end of the knob, and the shaft carries a slide which has a projection extending out through a slot in the side of the spindle, so as to lock the latch and prevent its being withdrawn when thus engaged.

PORTABLE ASH BASKET.—Elizabeth J. Lincoln, S. F. No. 420,559. Dated Feb. 4, 1890. This portable ash-basket consists of a movable foraminous receptacle, which is placed within a grate for the purpose of containing the ashes produced by the burning of the fuel, and in connection therewith of handles whereby it may be removed. The basket is placed within the grate before any fire is made. The material for the fire is put in the basket and lighted the same as in an ordinary grate. The basket retains the ashes, etc., and is lifted out of the grate with the ashes, put in a suitable box, and carried out without any dust or dirt being made.

ADJUSTING COLLAR FOR PAN-DRIVERS.—Theo. A. Washburn, Gold Hill, Nev. No. 420,752. Dated Feb. 4, 1890. This is a novel collar encircling the shaft and carried by the driver of amalgamators, settlers, etc. The collar consists of a metal ring having a groove in its periphery. The collar is feathered on the shaft so that it will slide up and down on the shaft as the shoes and dies wear. The collar lies within the drivers, and through said driver pass three set-screws into the peripheral groove of the collar so that it will move up and down with the driver. The object of this collar is to prevent the driver and the muller from swinging out of their regular course. New drivers often awing from the very first, even though they are bored to it closely to the shaft. They get worse by use, until the shoes of the miller will be worn out on one side while those on the opposite side will not be worn more than one-half. When a pan is thus faulty it will not do good work, and there is also a great waste of iron; but by the use of this adjusting collar the driver is held true to the shaft and will not swing out of its course. The collar being a separate piece, can be readily renewed when necessary.

CHART, READING AND NUMBER STAND.—Fannie L. Matson, San Jose. No. 420,560. Dated Feb. 4, 1890. This is an improved device which is especially adapted for use in schools to support cards or numbers; also for maps, charts and other papers for the purpose of instructing in schools. The present invention is designed to provide a simple knockdown stand or support for various maps, number or word charts and such other matter as may be useful for the purpose of instruction.

SUGAR-CANE SLICING MACHINE.—John N. S. Williams, Honolulu, Hawaii. No. 420,427. Dated Jan. 28, 1890. The object of this invention is to provide a cane-slicing machine of great capacity, simple in construction, and not liable to get out of order. The cane is sliced so as to prepare it for diffusion.

Sierra City.

Sierra City's outlook for 1890, says the *Tribune*, is better than it has been for a long time. There has been a great depression in every kind of business here for over a year past, which is owing mainly to the unscrupulous management of a number of mining prospects. This is unquestionably the principal reason. We, nor anybody else, know no other cause than that men with capital have been humbugged with infernal prospects so much lately that they became really afraid to invest when they were offered a good mine and guaranteed a square deal. Capital is just the thing a place like this needs, but so long as mines that are known could never be made to yield an ounce of gold are palmed upon capitalists, the place will always suffer for the want of it. We know that Sierra City has some poor prospects as well as other mining districts, but we believe that this district has more good mines and fewer poor ones than any other place that can be mentioned.

The reason that we have to believe that Sierra City will be a lively town in the spring is because the following mines will be in operation then: The Young America, with 160 men; Mountain Lodge, 150; Sierra Buttes, 50; Marguerite, 60; Cleaveland, 40; Salinas and Mercer, 30; Chips, 25; California, 10; Northern Belle, 10; William Tell, 10; Butte Saddle, 25; Crowell & Co., 20; besides several other small mines that work from five to eight men. It must be remembered that the mines mentioned above are right in and around Sierra City. We could mention numerous others that lie in Gold Valley, only a few miles from here, that help the town more or less.

OIL IN FRESNO.—Oil has been struck in a well 15 miles west of Huron. The flow is a large one and the oil of good quality. The property belongs to a Los Angeles company, William Leete being at the head of the enterprise. Several other wells will be bored next spring.

The Fulton Rock-Breaker.

(Concluded from page 109.)

ont, as the crushing of the rock upsets the wrought-iron bars and thus tends to force them still more firmly within the band. The shoes and dies, after becoming worn on their lower faces, can be reversed, thus greatly increasing their life. These shoes and dies, wherever used, have given excellent satisfaction and will wear longer than steel.

The distance the jaws are set apart is regulated by means of wedges at the back of machine, which can be easily and quickly adjusted by one nut and while rock-breaker is in motion. The seats in which toggle joints work are of steel, and can be replaced when worn. Two pieces of gaspipe are led from each toggle seat to the top of machine, by means of which they can be conveniently oiled. A large opening in each side frame allows the toggle-plate between pitman and swinging jaw to be removed and replaced when worn, without disturbing other parts.

The shaft which supports the swinging jaw is fast to the jaw and moves in the bearings on each side frame. This overcomes the pounding and jumping due to lost motion which soon appears when jaw moves upon the shaft, as the caps on bearings can be tightened whenever wear renders it necessary.

The fly-wheels are fastened with taper keys rounded to suit the surface of the shaft, so that in case of accident, such as a sledge falling into jaws, the belt can slip and rock-breaker stop while the wheels exhaust their motion, thus preventing serious injury being done to working parts. The rock-breakers can be entirely taken apart for transportation when desired.

The general form and design of this rock-breaker is such as to insure the greatest possible strength. All parts are carefully proportioned, the metal being placed where it will do the most good, and heavy tensile strains entirely taken by wrought iron.

Miners' Tools.

Mine managers, or those under them in immediate charge of the men on each shift, should always be careful that every workman is supplied with a sufficient quantity of proper tools in proper order. It is damaging to the owners to have a number of men underground without good implements with which to work. These should be kept always in good order and within reach of the place where the men are at work. In many mines this matter is not looked into as closely as it should be, and the consequence is that the men lose time and the work they do absorbs more vitality than it should. The more a mine manager looks after the comfort and wants of the workmen, the more will the men study the wants of the owner. Dall picks, etc., there is little excuse for; but even if there are a lot of sharp ones at the blacksmith shop, on the surface, that does the miner little good at the time. They ought to be furnished to him where he is at work, and spare ones should be ready at hand when wanted.

Mechanics and the Solar System.

We have received a little book from R. P. Traxler entitled "The Principles of Mechanics as Applied to the Solar System." The author has a number of illustrations in which he endeavors to show, by radiating lines, the manner in which the forces of the sun are applied to the planets, and the manner in which the forces of the sun and planets emanate from themselves. He gives also his ideas of the causes of magnetic currents, heat, ocean currents, earthquakes, etc., and the principle or cause of the tidal action. The author hopes that "the theories set forth will be carefully compared with all applicable natural phenomena and principles in mechanics with which the reader may be familiar, and that the claims advocated may be sustained only by the merits which they possess."

It has been the effort of the author to describe and illustrate the claims set forth in the book by principles that the general reader can readily understand and with which the common experiences of life familiarize us. The use of technical terms has been carefully avoided as much as possible, so that the reader, casual or otherwise, may be better able to reject or approve of the idea presented to the mind for consideration.

It has also been the aim of the author to represent as nearly as possible the operations of our planetary system within a space that will enable the mind to comprehend the movements of the planets and comets revolving around the sun, making the solar system appear as a simple and natural combined piece of mechanism, or a mere toy of the universe.

The table of contents indicates that the author has given consideration to asteroids, axial inclinations, comets, earth, earthquake, heat, Jupiter and his moons, Mars, mean distances, Mercury, the moon, moons of Uranus and Neptune, planetary formation and motion, moons and rings of Saturn, force and motions of the sun, the tides, Uranus and Venus. The book is one of 70 pages.

Further information of this work can be had by addressing the author, No. 240 Sutter St., S. F.

JOSHUA HENDY MACHINE WORKS,

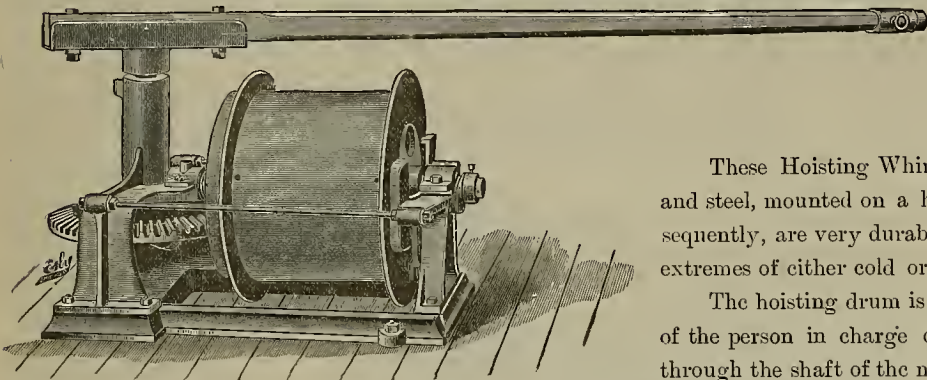
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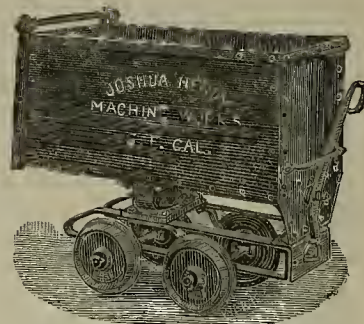
These Hoisting Whims are built entirely of iron and steel, mounted on a heavy base plate, and, consequently, are very durable and cannot be affected by extremes of either cold or heat or climatic influences.

The hoisting drum is completely under the control of the person in charge of the hoisting or lowering through the shaft of the mine.

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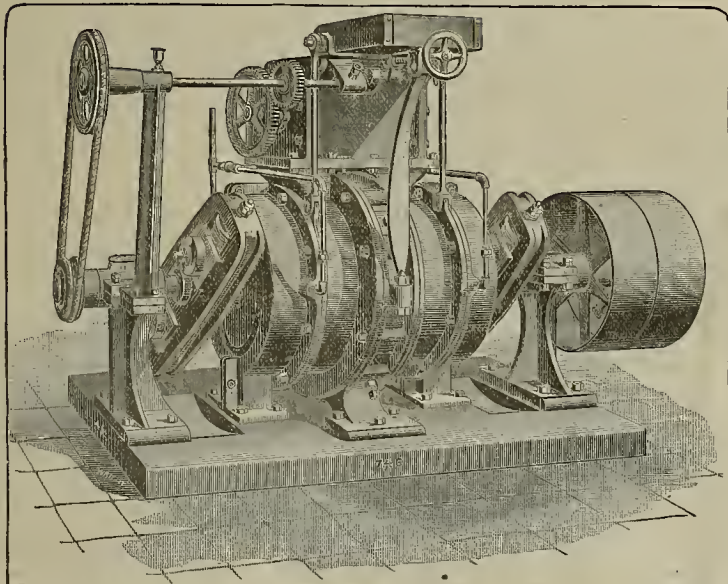
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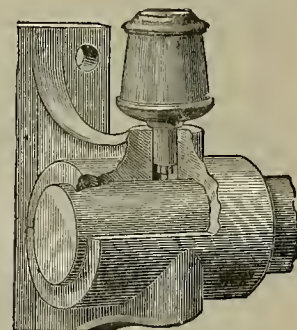
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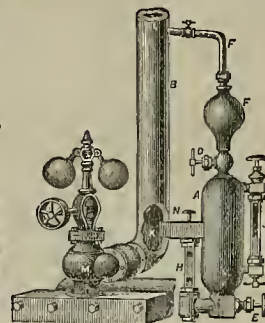


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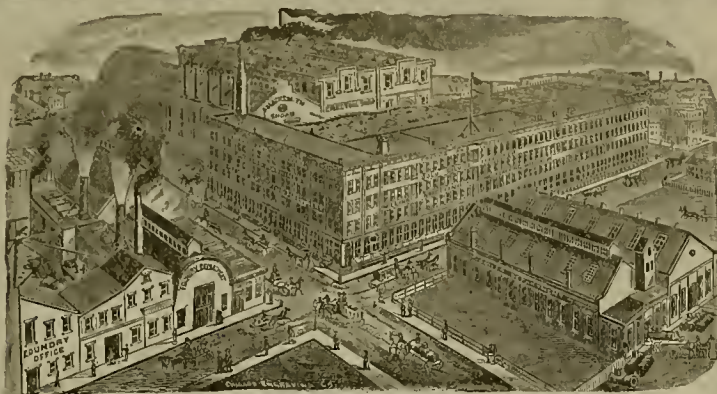
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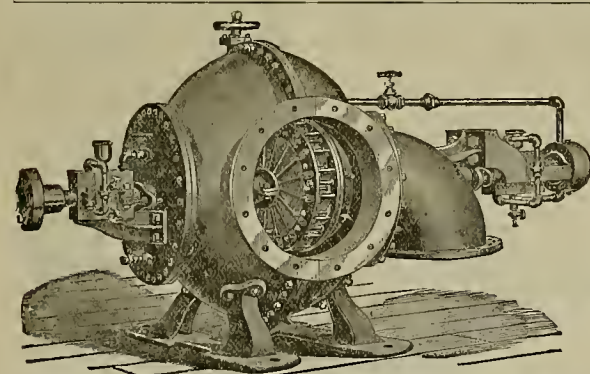
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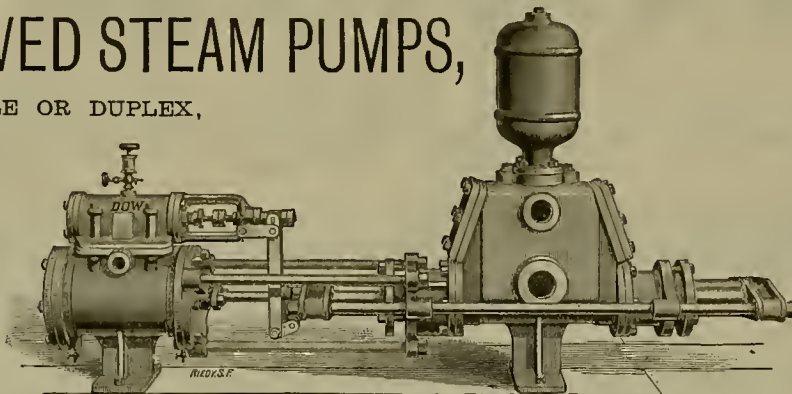
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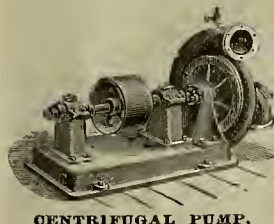
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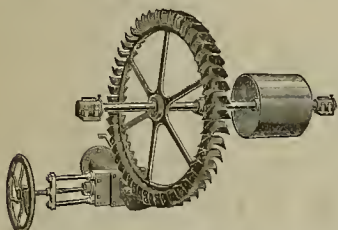
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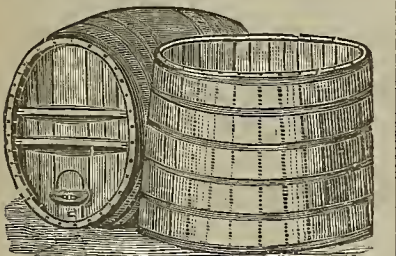


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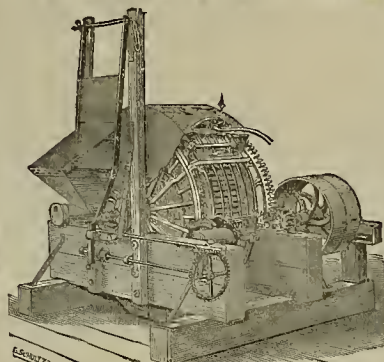
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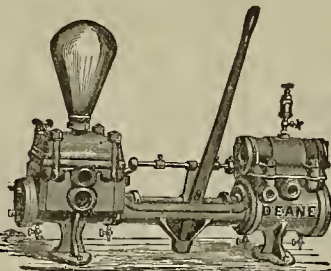
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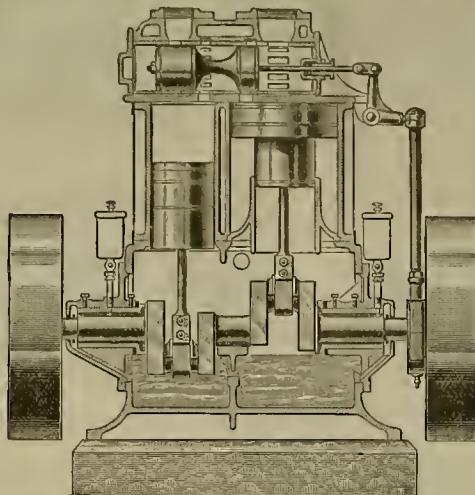
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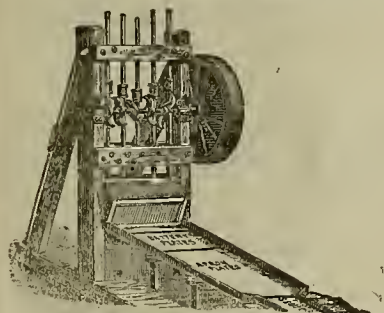
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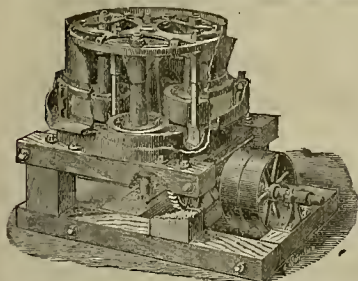
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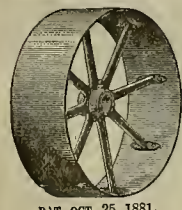
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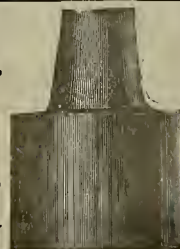
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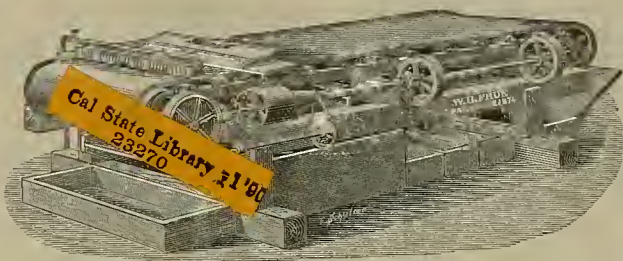
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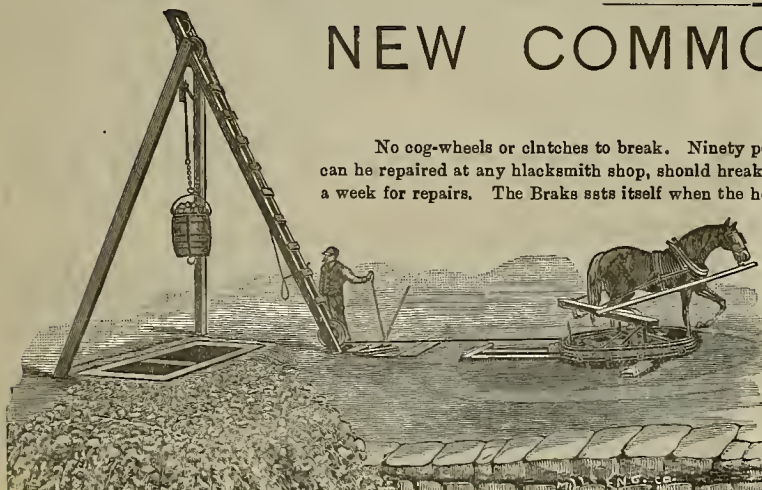
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Mining Ditches.

In the mining districts of California, ditches are constructed holdly with steep grades and on irregular lines, with numerous sharp curves. The cross-sections, originally uniform, become more or less varied. Absorption, percolation, evaporation and leakage reduce the flow. Under such circumstances it is difficult to be mathematically correct as to amount of flow and discharge. There is no generally-accepted formula for determining the velocity of water in open channels. The tables based on the old formulas, published prior to the works of D'Arcy and Bazin in France, and of Humphreys and Abbot in the United States, being founded on data which ignore the important factor of the nature of the bed and the sides of the channel, have proved unsatisfactory. Hydraulic engineers have been compelled to rely for correctness of calculated result on the application of a combination of a few known laws with experimental data, which latter, though all-important, have been too restricted for the deduction of reliable mathematical theory.

In a paper, some time since, Mr. Ang. J. Bowls gave some of the results of experience in this State in the measurement and flow of water in ditches, describing the different miner's inches, and discussing the various coefficients in use in determining flow. From this we take a few sketches, showing sections of mining ditches.

The North Bloomfield main ditch is 40 miles long, with a sectional area of 23.89 square feet, and a grade of 16 feet to the mile. It has many abrupt turns and a sinuous course. The Texas Creek branch ditch is about seven-tenths of a mile long. Its sectional area is 13.5 feet and the grade 20 feet per mile. The sides are rough and curves sharp.

On the Milton line, from Milton to Enreka—a distance of 19.4 miles—the sectional area of the ditch is 20.39 square feet, grade 19.2 feet per mile for earth-work and 32 feet per mile for flume. The line is very irregular, having many drops and obuses. The distance from Milton to the measuring-box at Bloody Run is 29½ miles. The minimum established grade for the last ten miles was 16 feet per mile, with a sectional area for the ditch of 23.05 square feet. The La Grange main ditch, 17 miles long, has a sectional area of 22.5 feet and a slope of 7 feet per mile.

In all these canals, after the artificial banks are well consolidated, the water area is increased beyond the original excavation in the natural ground. Important losses must vary in every ditch, depending on the nature of the



VIEW IN THE GRANITE QUARRY, HALLOWELL, MAINE.

ground and the character of the construction of the work and the season of the year. The feeders along the lines compensate largely for these losses.

The following facts show the magnitude of the losses due to absorption, leakage, evaporation, etc.: Three thousand miners' inches of water (a flow of 75 cubic feet per second) turned in during the dry season at the head of the Bloomfield ditch, will deliver 2700 inches (67.5 cubic feet per second) at the gauge 40

miles distant. Twenty-four hundred inches of water (60 cubic feet per second) turned in at the head of the Milton ditch delivered formerly at the gauge, 29½ miles distant, 1450 to 1600 inches (36.25 to 40 cubic feet per second), but at present 2500 inches (62.5 cubic feet per second) turned into the head of the ditch, delivers 2000 inches (50 cubic feet per second) at the gauge.

The Enreka Lake ditch, with 2500 inches turned in at the head, delivers at the gauge,

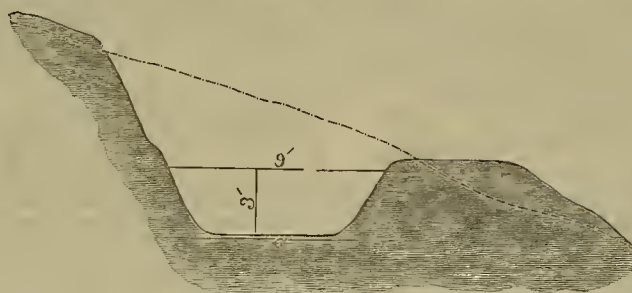
33 miles distant, about 1800 inches in the dry season.

Granite Quarries.

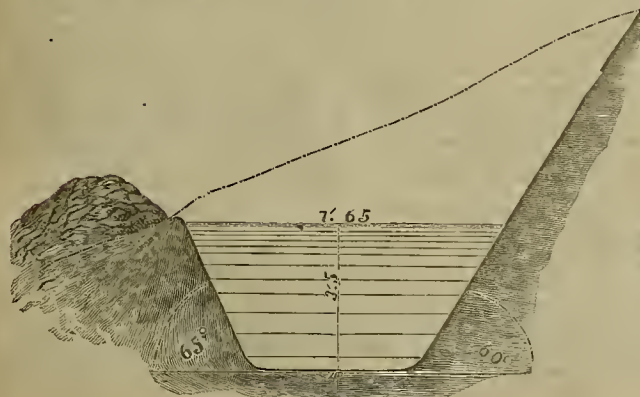
As early as 1853 a granite quarry was opened in Sacramento county, in this State, and since then others have been systematically worked in Penryn and Rocklin, Placer county. The Penryn quarries were first opened in 1864. The rock varies in color from light to dark gray, one variety, which contains both hornblende and biotite, being almost black on a polished surface. They are, as a rule, fine-grained and take a good polish. Blocks more than 100 feet long, 50 feet wide and 10 feet thick, have been quarried out and afterward broken up.

A fine-grained light granite is found on the line of the S. P. R. R., between Los Angeles and Cucamonga. Its texture is as fine as the finest Westerly, R. I., or Manchester, Va., stone, and of a uniform light-gray color. A coarser stone is also found at Sawpit canyon, in the same county.

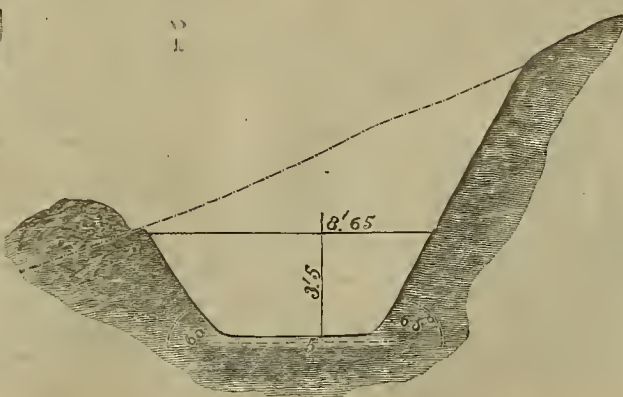
We give herewith a view of the famous granite quarry at Hallowell, Me., where the rock is celebrated for its heavy and fine working qualities, and is in demand for statuary and monumental work. The rock is properly a gneiss, but showing no signs of stratification in the hand specimen, is classed as a granite. As illustrative of the great extent of the quarries shown in the cut, it is stated that blocks 200 feet in length, by 40 feet in width and 8 feet in thickness, can be broken out in a single piece if so desired. There is no gap between the sheets, and little or no pyrite to cause discoloration. The sheets, as is usually the case, increase in thickness downward, being about one foot thick at the surface and ten feet thick at the bottom of the present openings, which are from 50 to 60 feet deep.



SECTION OF LA GRANGE DITCH



THE MILTON DITCH



THE NORTH BLOOMFIELD MAIN DITCH

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

The Mines of Rocky Bar, Idaho.

EDITORS PRESS:—The mineral resources of Idaho, both in placer and quartz, are about to astonish the world. Heretofore surface prospecting has been the rule; during the last two years, however, more thorough work has been done, and in many districts with most gratifying results. It is not the intention of the writer to devote much time to the description of old mining properties in the vicinity of Rocky Bar, the history of which is so well known, but rather to call attention to some of the more newly discovered bonanzas.

The Ophir mine, owned and operated by the Comfort Consolidated Mining Co. of New York, is situated immediately north of the old Hardscrabble placer mines, and about two miles northeasterly from the town of Rocky Bar. This lode had been located and relocated by different parties who were without the necessary means to develop the property, and, although well satisfied that millions were there, they were forced by circumstances to abandon the claim; hence the Comfort Con. Mining Co. have the honor of developing the first billion-producer on the Ophir belt, simply because they were the first and only parties that were able to couple good judgment with the requisite capital. Fortune has smiled upon them, and the outlay of a few thousand dollars has rewarded them with a well-defined vein of ore six feet in width, milling from \$75 to \$100 per ton. A fair estimate of the value of ore now in sight would not be less than \$1,500,000.

Let fall this company was so well satisfied with the developments made by their superintendent, Steve Oglesby, that they resolved to erect a mill, although winter was staring them in the face. The result is that, after encountering numerous difficulties, they have, through the energy and zeal of that indefatigable mill-builder, Col. John M. Thexton, been able to realize their fondest hopes; and to-day, and for the past three weeks, an improved Frazer & Chalmers 20 stamp mill, with a large double-drum hoisting plant, two Golden Gate concentrators and a three-compartment working shaft, are in operation, all the machinery moving with the precision and correctness of planetary revolution. I must say that the Comfort Co. are to be congratulated for the energy they have displayed and the success they have achieved in Rocky Bar.

The Empire lode, situated north of, parallel with and adjacent to the Ophir, gives every promise of becoming equally as valuable as its renowned neighbor.

Placer Claims.

Last fall while on a prospecting tour in Central Idaho the writer had the pleasure of meeting Major Comfort at Salmon Meadows. The major, together with Superintendent Oglesby and Surveyor Towne, were on their way to survey some placer locations at the northeastern end of Long Valley on Boulder creek, Boise county. These placers were worked by Oglesby as early as 1868, ditches built, and water brought upon them, but the Indians becoming troublesome, he was forced to leave. They have lately been relocated and sold to the Comfort Co. After a thorough examination, the owners are so well pleased with their bargain that they intend to construct the necessary flumes, ditches and hydraulic machinery to successfully work their ground this coming spring. They have 20 locations with an area of 400 acres, and I believe that they will meet with as good success there as they have at Rocky Bar with their lode mining property.

Hydraulic Elevators.

The reason why these placers have not been more extensively worked before this is this: the ground does not afford sufficient fall for a dump, and although known to be rich, the old-fashioned placer miner had no means of obtaining this defect. This company has secured a large volume of water, with ample pressure from the numerous water-courses and lakes in the mountains northeasterly from their ground and intend to work with hydraulic elevators, thus raising the gravel to any desired height, and in this way securing a sufficient dump for their tailings. This process necessitates the outlay of considerable capital, but close calculation has demonstrated the fact that the returns will pay a handsome interest on the investment.

While prospecting in the mountains at

The Head of Boulder Lake,

The headwaters of Boulder creek, about ten miles from the above-described placers, your correspondent, together with John Knox and others, discovered a well-defined and valuable mineral belt, which we traced through the mountains for a distance of 12,000 feet. The average width of this lode is about five feet. Along the footwall for about 15 inches, the ore assays \$33.15 gold and \$12.25 silver; the balance of the lode is strongly impregnated with silver chloride, assaying 101 ounces of silver per ton. The surrounding country is heavily timbered with fir, pine and tamarack, as yet untouched by the woodman's ax; water and grass, with game of all kinds, abound here, in fact this country is the hunter's paradise and the prospector's realization.

Your correspondent, while returning from the

mountains, again met the surveyor and his party with theodolite, chain and staff, surveying and marking the boundaries of the rich placer bonanzas, while Major Comfort, with a force of workmen, had sunk about 30 shafts to bedrock, and was filling as many different sacks with the golden gravel for shipment to New York. This gravel, I am informed, yielded far greater results than was expected, and demonstrated beyond a doubt the remarkable richness of this property. When it is considered that this ground is about midway between two of the richest placer-fields ever discovered in Idaho, namely, Florence and Warren's on the north and the Boise basin on the south, the results obtained from the gravel tested are not at all surprising.

Referring again to mines near Rocky Bar, I will call attention to a mountain range in which

Many Rich Prospects

Have been discovered, and which contains within its depths the famous Mountain Goat, so successfully worked by Major Frank P. Cavanaugh.

As you ascend this mountain from the south, at a point about 1000 feet north of the town of Rocky Bar, you will find the Birdie Q. mine, which has been worked quite extensively during the last two years by Messrs. Van Schaick & Quitzw, the owners. They have sunk an incline on this lode to the depth of 75 feet, and made connection with the same by means of a tunnel 150 feet long, driven from the east. The quartz taken from this incline and tunnel milled \$25 per ton. This lode is three feet wide, and can be traced on the surface the whole length of the claim.

West of the above lode and adjoining the same is the Mountain Chief lode, the croppings of which are from one to six feet in width, and prospects well in free gold. Aside from the annual assessment work required by law, little has been done on this claim. There is, however, no doubt but that with a judicious outlay of a moderate amount of capital, a mine could be opened second in value to none in the camp. This location is also owned by Van Schaick & Quitzw.

Northerly and farther up the mountain is the Duncan mine. This lode has been out through by a tunnel and drifted upon by cross-roads from the same, showing a good lode, but very irregular and uncertain, demonstrating the fact that this work has been done too near the surface. Were the owners of this mine to sink upon the lode at some point where it is exposed in the tunnel, they would undoubtedly be rewarded for their trouble and expense.

The Idaho Consolidated

Gold & Silver Mining Co. of New York are the owners of the North Pacific, Almaden, Golden Osl, Golconda and San Jose, five patented claims lying between the Duncan on the south and the Ophir on the north. Quite an amount of money has been expended by this company to place this property in a condition to warrant the erection of a mill, but unfortunately the tunnel which was so nicely and thoroughly constructed was driven in the wrong direction for a distance of between 700 and 800 feet, every foot of which was carrying them farther from the ledge. Under these circumstances it is not surprising that discouragement and consequent stoppage of work followed. In conversation with U. S. Mineral Surveyor Towne, who is thoroughly familiar with every lode and claim in this section of the country, he informed me that the mistake made by the Idaho Consolidated arose from the fact that croppings of several ledges had been considered by the person in charge as the outcrop at different points of one and the same ledge, thus misleading him as to the proper course of the lode and the consequent direction in which to drive the tunnel. I believe that the Golconda or San Jose can be made as valuable as either the Ophir or Mountain Goat, and that a few thousand dollars properly expended will effect this result.

West of and adjoining the Comfort Con. Co.'s property is

A Group of Six Quartz Locations,

Owned by Cochrane, Fitzgerald & Co. A continuous body of ore can be readily traced upon the surface direct from the Ophir workings to the extreme western boundaries of these claims; it is, in fact, upon the Yankee, Jim Blaine and Josie locations that the celebrated Ophir lode appears to have reached its grandest proportions, for a mountain of quartz is here exposed to view for a distance of 3000 feet, any of which will mill from \$10 to \$15 in free gold, while samples selected from certain portions of the ledge have assayed over \$300 per ton; without exaggeration, we freely state that this property offers, in our opinion, a more safe and profitable investment for capital than any mining project that the writer has examined for many years.

West of Rocky Bar

And adjoining the eastern end-lines of the old reliable Elmore, Confederate Star and Objective claims are locations worthy the consideration of any syndicate seeking investment in mines. The Esmeralda is the eastern extension of one of the ledges in the Confederate Star claim, as has been thoroughly demonstrated by the Elmore Company in sinking their new shaft, which is located at the common end-line of the two claims. The vein is from three to nine feet in width, and the last run of ore milled \$45 per ton, some of the rock assaying over \$400 per ton. The owners, Messrs. Geo. Winder & Co., are expecting daily to make a sale to

parties well able to work the mine to the best possible advantage.

Running parallel with the Esmeralda and east of the Ida Elmore is the Surprise lode claim. The general course of the Elmore vein as indicated by the underground workings will necessarily lead this lode through the Surprise ground, near the eastern boundary of which very heavy croppings exist, similar in character to those of the Elmore. At this end of the claim a tunnel is being driven that will tap the lode at a depth of 400 feet. This claim belongs to Thompson, Tonkins & Quitzw.

South of the above described claim and east of the Objective is located the Great Republic, which, together with the Wedge location lying south and west, contain within their boundaries the apex of the Alturas lode. That this assertion is well founded will not be questioned by any mining expert upon an examination of the ground.

There is no doubt but that this group of mines, extending from the Tiptop on the south to the Viehnn on the north, completely cut off the Alturas, Elmore and South Confederate Star lodes at their common end lines, running thence easterly from the Elmore Co.'s works. It would be of great benefit to the camp were this property secured by some company having the energy and capital to properly develop the same, the ground being in all respects similar to the Elmore, and possesses the additional advantage of having its rich bodies of ore near the surface still in all their virgin purity, ready to repeat the history of the Elmore as a gold-ore-dancer.

AUG. QUITZW, M. E.
Rocky Bar, Idaho.

River-Bank Cutting—Its Causes and Prevention.

EDITORS PRESS:—A correspondent of your paper, writing from Ventura, calls attention to the increase in damage to valley and bottom-lands by the streams of Ventura county, and especially by the Santa Clara river. This is true not only of all our streams recognized as such, but of new torrent-temporary channels forming through the southern country. It is also increasingly true with each year. This change of stream action may be said, in a general way, to have commenced within 20 years. It has been rapid during the past ten.

Many years ago I called the attention of the Department of the Interior at Washington and the president of the Southern Pacific Railroad Company at San Francisco to the commencement of this torrential action. It was pointed out that fires were being set on the mountain watersheds of our streams, destroying large amounts of brush and timber; that extensive hill districts were overpastured, especially by sheep, and that the axman was not idle in the mountains. All these things, it was said, could only have one result, judging from the recorded experience of Europe, viz., increased torrential action and eventually decreased permanent water. To prevent further injury to land, and consequently to the tax-paying and freight-producing capacity of the country, and to the railroad road-bed, especially in the Soledad canyon (Santa Clara river), it was urged that a forest policy should be adopted looking to the proper management of the mountain watersheds of the country.

I do not cite these letters as a case of "I told you so," but to show that long ago the conditions were perceived that would, if continued, do the damage now complained of. In the first report of the State Board of Forestry I went over this ground again and brought up a number of cases of the recent creation of new and dangerous torrents in California. Among other instances from Europe, I called attention to the complete ruin of 200,000 acres of good farming land in the valley of the Durance, in France, following the outting and destruction of the forests on its mountain watershed, accompanied by overpasturing by sheep.

Nothing serious has been done in all these years to prevent their destruction—in fact the Federal Government owning the lands is the only source of remedy, unless, indeed, the State should apply to buy all these forest lands for the purpose of preserving not only them but a large portion of its tax-paying lands also.

The question from Ventura is, "What is the remedy now?" For the lands out away, for the gullies and barrancas formed, for the swales cut out, for the lands covered with sand and stones, there is none. These are ruined forever, but for the lands still safe?

First of all is the old one, an intelligent forestry system with intelligent men at its head, and all the mountain, forest and brush land under their control, whether public or private.

But now that our Southern watersheds, with an equal rainfall, deliver so much greater volumes of water for short periods than formerly, we may well look into some suggestions to limit as far as possible the damaging effects of this action.

In the first place we must recognize several facts before we can go into the subject intelligently. One is that the same volume of water in our streams now has more erosive or cutting force than formerly. The reason of this is that our streams are now more heavily charged with sand and other detritus than formerly, and they consequently act upon everything with which they come in contact like a sand blast does on glass. Take the sand out of the air and the glass is not cut; take the sand out of

your river water, and while it will still cut it will not do so to anything like the same extent as with the sand. I have made a personal and experimental study of the erosive power of water with and without sand, and know that the above statement is true. The reasons why the streams carry more sand and detritus than formerly are threefold.

1st. The forest and brush destruction in the mountains. This covering removed from a steep watershed, every rain will carry down more of the mountain soil, sand and stones into the water channels than before. We have here two plain effects; more water is delivered with a given rainfall from a given watershed within a given time than before the forest destruction, and the volume of the water so delivered must be increased by the volume of the detritus it carries. This addition of flood height by what the water contains is considerable. Any one can obtain some idea of it by taking a bottle of turbid flood water and noting the sediment formed after standing.

The more detritus a stream carries, so proportionately greater is its tendency to change its channel. Thus a muddy stream is continually throwing itself now against one bank and now against the other. This is not the case with clear streams.

2d. Over-sheep-pasturing whereby the herbage which detains the water and holds by its roots the soil, is too closely removed. I have never observed a gully commence to cut on well-grassed land no matter how steep. On the other hand, one often sees out sand washes entirely arrested when coming from bare to grassed lands.

3d. Cultivation. As this is always on more or less level land, it plays a smaller part than it otherwise would.

The first two causes can be entirely eliminated, the third cannot. But while we are attending to these causes, or rather not attending to them, the river cut and the outlook is for the entire destruction of the bottom-lands. Your Ventura correspondent suggests wiogdams made by driving piles throughout the cultivated course of the Santa Clara. Such a system would be very costly both for construction and maintenance, and besides would be of very little service unless made by engineers specially skilled in river work. My own experience of preventing the erosion by rivers of their banks is limited. As far as it goes, however, it has been a success. In my case, a ditch about three feet deep was dug in the stream-bed along the whole length of the exposed bank; into this was placed brush, the whole line thickly set with willow cuttings and the brush wired together and to posts or fixed objects at various points. This has stood the brunt of all the waters since October, while the same stream has cut away its banks and carried away bottom-lands in my neighborhood. The idea for the future is that when the brush decays and the wire rusts, the willows will have grown and formed a permanent protection. Certainly a thick mass of willows will resist a great deal of water. When the water in a stream is constant or near the surface, the willow will be the cheapest to plant, the surest to grow and the best protection.

Where, however, the water is not constant, I would suggest the brush-wired hedge with poplars, cottonwoods or *Eucalyptus viminalis* planted closely in or by the side of the hedge. The *E. viminalis* would probably be best in the end, though not so cheap to set out. Take precaution not to let the stream get behind the head of the hedge.

So much damage has been done lately by water erosion to lands, and so much more is to be anticipated unless measures are taken to prevent it, that the subject is one of very great importance.

ABBOT KINNEY.

Lamanda Park Los Angeles Cal.

Balls of Fire.

EDITORS PRESS:—Your article in the PRESS of February 8th, page 96, headed "Strange Phenomenon," as observed in Texas on a railroad train, also in New England in 1834, reminds me of an occurrence of the same nature in Belfast, Maine, about the year 1844.

I was walking across the long bridge over an arm of the bay, and my attention was attracted by an immense ball of fire of about the color of an electric light shooting through the air in a horizontal line, with great velocity, and leaving a trail behind of the same color described in the articles referred to above. This trail floated in the air until the two ends met and formed a complete circle fully as large as the half-circle spoken of, and lasted while I was walking over a mile. It was plainly visible, though somewhat faded, when I went into the house. This was near midnight, clear and starlight.

Might not such a shooting ball of fire have caused the phenomena referred to, the fire having exhausted itself before discovered?

Oakland, Cal.

A SUBSCRIBER.

LOCOMOTIVE FIRING.—By a new device invented by James Resgen, the inventor recently ran a Pennsylvania railroad locomotive between Harrisburg and Philadelphia continuously for one week without changing the fire in the furnace, and nothing of the kind has ever been attempted or accomplished before. The invention will revolutionize the old-time methods used in firing locomotives if the railroad companies adopt it.

Californians on the Atlantic.

EDITORS PRESS:—On Sept. 4th, at about 5 P. M., four steamers—City of New York, City of Rome, Tentonic and Ohio—left the Mercey river in front of Liverpool for the United States, carrying not less probably than 4000 passengers.

The steamers anchor in the stream and steam launches transport passengers and freight to them. To remain on the floating dock and see the passengers as they come down with their baggage to go on board the launch is an interesting and instructive sight. The steerage and second class are taken on board in the forenoon and cabin passengers last. The steerage passengers furnish their cups, dishes, wash-basins (tin), and mattress and blankets, I presume, if they have any. Here you have all kinds of models of trunks from the latest style to the rudest in construction and most aged.

Printed tickets are furnished the passengers of two kinds, and are pasted on the end of the trunk, stating whether wanted in stateroom or to be put down in the ship's hold. The trunks are hoisted on board by steam-power by putting a sling around eight or ten, according to size, and are handled pretty roughly. I saw several of them that will never be able to make another tour without a good deal of nursing.

It was foggy all the way over to Queenstown, and we had not got out of the harbor before the fog-whistle was sounding, and kept up nearly the whole time. We arrived at Queenstown about 9 o'clock A. M., two hours behind time. We did not go into the harbor, but two steam launches came out with passengers and their luggage, which took about one hour to transfer to our steamer. Some passengers and trading people came out in three row-boats.

The deck of our steamer must be nearly 25 feet from the water, and these passengers were pulled up by sitting in a howline at the end of a rope. They held on to the rope with their hands above their heads, and as they were being pulled up, they walked up the side of the ship, which worked very nicely with those that were used to it. The women came on board and sold apples, pears and nectarines. The men sold canes, bracelets, pipes and images cut and carved from the black oak of Ireland.

I cannot say we have had particularly rough weather, but it has been windy, cold and rainy, and about half of the passengers have been more or less sick.

We pass a large steamer nearly every day, and sailing vessels are in sight most of the time.

The most satisfactory thing we have seen on this trip was two icebergs to-day about 11 o'clock. When we first sighted them, I did not dare to look over the vessel for awhile, for I thought it was a hoax, as the officers said it was too late in the season to expect any. At a long distance they looked like the white sails of a vessel. The captain ran the steamer between the two, which were perhaps three miles apart. The one on the starboard or north side was as white as snow, and in fact appeared to be covered with snow, except one steep side, which showed the solid crystallized ice. It was something like a hundred feet high and covered perhaps nearly an acre of space. The top was shaped like a peaked mountain.

The one on the larboard or south side was much the larger and higher and darker, and looked as though composed of strata of alternate snow, ice and earth. I should think this one covered something more than an acre and was more smooth on its top. I think this was over 100 feet high. The wind and the gulf stream were drifting them to the southward. Smaller pieces could be seen drifting away from the larger. It was an interesting sight to see these frozen monarchs drifting so majestically and silently to their southern doom.

The air seemed to be uncommonly cold this morning and all the passengers could imagine they could feel the wind from these floating icebergs. I took my field glasses and peered at them on every side that presented itself to me, and there was only one thing that I could not see to make them natural and perfect, and that was that the painter had not got there yet with his paint-pot, and there is one fair spot on the face of the earth that is not marred by the ever present "Pearse" soap or "St. Jacob's oil."

On shipboard one has one of the grandest opportunities to study and portray human nature. If I had a facile pen I think I could easily get up something that would be hitting a "yaller kiver" hook or be handy to kindle a fire. We have something like a thousand souls on board, and it seems like a village; still there is plenty of room on this large, fine ship. We have the lights and shadows, beauty and comeliness, age and youth, position and ambition, modesty and affectation, piping and squealing of the pretensions that have been abroad. We have the doting mother who has been abroad with her darling daughters looking out for a future market for our surplus. I heard her say something about selling American girls to foreigners. I hope and expect she will make her report on the condition and price in the market.

A good many have the folding extension chair, which they stretch across the deck and lounge in them, utterly regardless of the convenience or opportunity of others to promenade.

It is amusing to hear some of the ladies who have been in Paris criticise the artists in Paris

and the pictures on exhibition. In one case, one edified the passengers at the table by stating some celebrated artist could not paint a hand so that it could be told from a dalmatian or an angel. I will not take up time by repeating any more of her learned disquisition on the arts. When the rolling of the vessel did not nauseate me, she did by compelling me to listen to her superficial attempt at showing her ignorance.

In the evening a discussion took place on the protective tariff. No particular new points were developed except the practical experience obtained while the debaters were in Europe this time. I think the affirmative side got the best of the argument, as it usually does.

On the evening of the 10th there was a concert in the cabin for the benefit of the seamen's orphans of Liverpool.

There are on board 48 representative American workmen called the "Scripps League," that are on their return from Europe, where they have been to investigate all branches of industry, agricultural, educational and professional. They embrace skilled persons in the several departments.

Scripps publishes four afternoon dailies, in Cincinnati, Cleveland, St. Louis and Detroit.

Henry M. Stanley.

The name of Stanley is a proud one in English history. And when his name is mentioned to-day, all minds turn to him to whom God has, through strange leadings, assigned so prominent a part in the deliverance of Africa from its thralldom.

It is now well known that his original name was John Rowlands, and that his parents had so little means that he was sent when three years old to the poor-house at St. Asaph to be brought up, whence at the age of 13 he was turned loose on the world to shift for himself. He was born near Denbigh, Wales, in 1840, the very year that Livingstone, aged 23, first entered Africa as a missionary. When about 14, he found his way to New Orleans from Liverpool as cabin boy of a sailing vessel, and there a kind merchant named Stanley, little knowing what he did, adopted him. But Mr. Stanley died before Henry came of age,



HENRY M. STANLEY, THE AFRICAN EXPLORER.

Scripps pays nearly all expenses, which will cost about \$20,000, and each department is to give a full and intelligent report of their observations, to be published in his papers. Among the party are four editors and four ladies. One of the ladies, Widow Barry, represents the cotton department. She holds an official and exalted office under Mr. Powderly in the Knights of Labor. She is called a public agitator speaker. She is a good deal on the Kearney order—more noise than education. I was introduced to her as from Sacramento, and a person who employs a good many Chinese. Before the echoes of the introduction had fairly died away, she sent a wave of indignation after the poor Chinese that would have swept them back to the flowery kingdom with one blast of her trumpet if I had not implored her to let them stay until they had picked one more crop of hope for me. I would like to see the reports of some of these commissioners in the rough; I think they would show a more intimate relation with tools than letters.

The 12th was rainy and foggy all day, and with a good deal of rough sea. We only experienced one day of the terrible storm they had about New York. We came to anchor about six o'clock in the stream, Thursday, the 12th, eight days from Liverpool. D. FLINT.

[This letter closes the series to the preparation of which Mr. Flint must have given much of his leisure time. Few men could find opportunity to write so much during a hurried tour, and few could make such a delightful combination of fact and fancy as he has done. He has shared with his California friends the advantages of his opportunities and they will thank him heartily for his instruction and entertainment.—EDS. PRESS.]

leaving no will, and the lad was again thrown on his own resources.

On the breaking out of the rebellion in the United States in 1861, young Stanley went into the Confederate army. He was taken prisoner by the Federal forces, and, being allowed his liberty, he volunteered in the Federal navy, being already fond of sea-faring and adventure. In course of time he was promoted to be acting ensign on the ironclad Ticonderoga. When the war was over, his love of adventure led him to travel, and he went to Asia Minor, saw many strange countries, wrote letters to the American newspapers, and even then was making for himself a name and fame. Returning to the United States he was sent by Mr. Bennett, of the New York Herald, to Abyssinia in 1868, a war having broken out between the British and the king of that country. There, Stanley got his first taste of African adventure.

In the autumn of 1869, the world was beginning to wonder whether Dr. Livingstone, the devoted Christian missionary and African explorer, was alive or dead. More than 20 months had passed since his last letter was written, and the world began to believe he had died in the heart of the Dark Continent. James Gordon Bennett, the editor of the New York Herald, was at this time in Paris, and telegraphed Stanley to meet him there, which, with his customary promptitude, he immediately did. On his arrival, he was confronted with the startling and wholly unexpected question, "Will you go to Africa and find Livingstone?" After a moment's reflection he answered "I will," and the agreement was at once concluded.

The 21st of March, 1871, found Stanley at Zanzibar, with a caravan of 192 followers, ready for the great expedition. On the 24th of October, at Ujiji, on the shores of Lake Tanganyika, he first met the famous missionary who was so powerful to influence all of his after life. They remained together till March 14, 1872, the younger man drinking in the spirit of the elder, and becoming, as he often declares, converted by him.

Two years later, in the spring of 1874, when the remains of Livingstone were carried back to England in one of the Queen's ships, for burial in Westminster Abbey, Stanley was one of those who bore him to his grave. It was then, he tells us, that he vowed he would clear up the mystery of the Dark Continent, find the real course of the great river, or, if God should so will, be the next martyr to the cause of geographical science.

The outlet of Lake Tanganyika was as yet undiscovered; the secret sources of the Nile were unknown, and even the then famous Victoria Nyanza was only imperfectly sketched on the maps.

The proprietor of the London Telegraph cabled Bennett, asking if he would join the new expedition. "Yes, Bennett," was the answer speedily flashed back under the sea, and the thing was determined. Stanley left England in August, 1874, attended by only three white men, and at Zanzibar the party was increased by porters and others, mostly Arabs and blacks, to the number of 224 persons, some of the men taking their wives with them; and on the 13th of November the column boldly advanced into the heart of the Dark Continent, having for its twofold object to explore the great Nile lakes, and, striking the great Luabala where Livingstone left it, to follow wherever it might lead. It has been rightly called "an undertaking which, for grandeur of conception, and for sagacity, vigor, and completeness of execution, must ever rank among the marches of the greatest generals and the triumphs of the greatest discoverers of history." August 9, 1877, Stanley emerged at the Congo's mouth, and "a new world had been discovered by a new Columbus in a canoe."

On his return to England he found an embassy from the King of the Belgians, who had been planning an expedition to open up the Congo country to trade, and who wanted Stanley to take command. With great reluctance he undertook the management of the International Association, as the new organization was called, and returned to Africa in 1879, where he remained nearly six years, hard at work, doing more than any other man to found the Congo Free State south of the great bend of the Congo river, having an area of 1,508,000 square miles, and a population of probably fifty millions. In obtaining the concessions of over 400 native chiefs, not one shot was fired. It was a grand victory over barbarism without the guilt of bloodshed that too often has stained such triumphs.

While Stanley was in this country, during the winter of 1886-7, he was called back to Europe once more to take command of an African expedition, the one for the rescue of Emin Pasha. June 28th, with a total force of 389, Stanley started eastward from a point not far from the mouth of the Aruwihmi. Progress was slow, owing to opposition of the natives and sufferings of the party as they marched through thick and gloomy forests. When they reached Ibwiri, 126 miles from the Albert Nyanza, Nov. 12th, the party had become reduced to 174, and most of those that survived were mere skeletons. After resting 12 days they resumed the march and in another week emerged from the deadly forest. Dec. 13th they sighted the Nyanza and encamped on its banks, but Emin was not there. They were too weak to march northward to Wadelai, the capital; the natives would not let them have a boat and Stanley would not take one by force; there were no trees large enough to make one, and his own boat was 190 miles in the rear because the men were too weak to bring it. There was nothing to do but to go back for the boat. In spite of Stanley's severe illness, which required a month's careful nursing, what was left of the force was back in the vicinity of the lake by the last of April. They found a note from Emin, who had heard rumors of their arrival and begged them to stay till he could communicate with them. Emin arrived in his steamer April 29th amid great rejoicing. The two parties remained together until May 23d, when Stanley, rested and reinforced, started back to Fort Bodo, where he had left men and supplies. He pushed still farther back, hoping to meet the other half of the expedition. But Major Bartelott had been shot and the demoralized rear column had gone to pieces, believing the report that Stanley was dead. Though disappointed and crippled, Stanley went back by a shorter route to the Nyanza and again united with Emin.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

FINISHED.—Amador Dispatch, Feb. 15: The tramway at the Amador mine has been finished and the mill will be started as soon as their concentrators can be got up from Ione. The roads have been so bad for the last two or three months that no heavy machinery could be hauled up, but they are improving rapidly now.

MIDDLE BAR.—Middle Bar, which has for a long time been very dull, is having some sort of awakening, due to the work being done on the Hardenburg. The hoisting works are being erected. Mr. Matson is directing the work, and it will be finished in about two weeks. D. Donnelly of Sutter furnishes the machinery and C. O. Mitchell the pipe. The work being done gives employment to quite a number of men.

KEYSTONE.—Ledger, Feb. 15: A new strike, which is believed to be pregnant with future prosperity for this, the oldest bullion-producer of the county, was made last week. Men have been employed in prospecting operations at the 1400-foot level. For 400 feet above that level the ore body was lost, and extensive prospecting failed to reveal its existence. The unwelcome conviction began to force itself upon the minds of many that the mine was worked out, that the pay chute of this famous mine did not reach down into the earth beyond 1000 feet. This idea has been exploded. In cross-cutting west, a distinct ledge, said to be 16 feet wide, has been encountered. We are informed there is no doubt of its paying nature. The length of the vein is not known, but drifts will be run north and south as speedily as possible to determine this point. The discovery, it is generally believed, will give another long period of prosperity to this grand gold-producer.

AMADOR GOLD MINE.—The concentrators and other machinery necessary to the completion of the mill are now arriving, and the work of putting them in position is to be pushed ahead as rapidly as possible. Ex-Senator Wallace of Pennsylvania, and Mr. Harrison from London, who is largely interested in the property, arrived here last Saturday, and it is understood they intend to remain here until the mill is completed. This will take at least a month, providing we have favorable weather to admit of the hauling of the 50 tons of freight from Ione. The number of working hours with some of the miners was increased from eight to ten. This action is not unusual. In those places where the ventilation is not good, eight-hour shifts are in vogue; where the air is better, ten hours are required. Some dissatisfaction was felt on account of pay-day (the 12th instant) passing, and the workmen failing to get their money. They are now two months behind. This, however, while it is hard on those who depend entirely upon their monthly wages for the payment of their bills, should cause no serious anxiety. The vast improvements at the mine and mill—undoubtedly not surpassed if equaled in the State—are a sufficient guarantee for the payment of a few thousand dollars arrearage for wages.

NEW LONDON.—Thirty stamps of the New London mill were started on Tuesday, and will be kept running steadily.

MISCELLANEOUS.—At the Casco or Hardenburg mine at Middle Bar, they are engaged in putting up a water-power hoist. They have 400 feet of water to take out of the shaft, and it is the intention as soon as this is accomplished to sink the shaft several hundred feet deeper. At the North Gower they have secured a lot of pipe from the Treasure Box mine, and a water-wheel used at the Potosi, and will put up water-power hoisting works as speedily as possible. The Grass Valley hydraulic is running steadily with an abundance of water.

Calaveras.

WEST POINT.—Calaveras Chronicle, Feb. 15: Mr. Moore has a large force of hands engaged in moving the machinery from the Water Lily mine to the Blazing Star. It is expected that everything will be ready to start up in about two weeks. The Lone Star mill is doing good work. Mr. G. L. Brown, the superintendent, has just returned from San Francisco and will, it is expected, make quite a number of hearts glad. The Lone Star is not the only mine in the district. I know of several good mines owned by prospectors who have not the means to handle their properties when they reach water-level, which they do at a depth of from 75 to 100 feet. It is safe to assert that there are hundreds of California and Eastern capitalists who, if they only knew the chances this district affords them to get hold of a good mining property, there would not be many left in a year's time. The mines in this district have just been prospected enough to prove conclusively that this is no pocket mining, but legitimate and well-defined ledges with rock bearing gold and silver and assaying up in the hundreds. With such mines as the Lockwood, that has produced thousands of dollars, the Lone Star and Blazing Star, which have as fine-looking ledges as can be found anywhere in this State, ought to be proof enough for men looking for mines to see for themselves. We also have some rich gravel deposits in this district which have scarcely been prospected as yet, although the water facilities are abundant. All that is needed is capital to develop some rich placer mines. Operations will be resumed at the Tom Payne and Scorpion mines in a few days. Messrs. Gilgore & Kizer have been taking out some very rich rock from their mine which lies southwest of the Blazing Star.

DRY CRUSHING.—Angels Echo, Feb. 13: Otto Dolling will have eight tons of quartz crushed in C. D. Smyth's dry crusher, situated near Angels, next week. In connection with the crusher, Mr. Smyth has a process of his own for the treatment of refractory ores.

CLOUD.—Work is progressing on the Cloud mine near Albany Flat, owned by Mr. Otto Dolling. A perpendicular shaft is being sunk alongside of the ledge, and it is the intention of Mr. Dolling to run a crosscut and tap the vein as soon as the shaft reaches a satisfactory depth.

El Dorado.

TO BE DEVELOPED.—Cor. Placerville Observer, Feb. 18: W. B. McKinney came up from the Capli-

tal City on Tuesday, and from what can be learned, he and his partner have sold or bonded their portion of the old Stuckslager quartz mine, south of Lotus. It is now in the hands of a Sacramento company, who intend, as soon as the weather will permit, to erect machinery for developing the claim. This mine has heretofore been worked on rather a poor plan, and we are certain that if the new company are in earnest, put up machinery and work the mine as it should be worked, they are sure to realize handsomely from the property, besides helping to build up the town and make things more lively. We hear that a claim has been bought by the Chinamen, in Coloma, the price paid being \$1200. It is a placer mine, and will be worked in that style.

Inyo.

TRAIL TO SALINE.—Index, Feb. 12: Following the Index suggestion of last week regarding a short and practical route from Independence station to the Saline Valley borax-fields, it is claimed that an easy route for a pack-trail can be found between the points named, and that the distance will be but little, if any, in excess of 20 miles. The route is now being gone over by a practical man, with a view to contracting for the transportation of borax by pack-train at a much less figure than the present cost of hauling.

QUARTZ.—Inyo Independent, Feb. 14: A couple of young men who came to Big Pine recently from Kern county went prospecting in the foothills west from Big Pine. They struck a ledge of quartz, and from 300 pounds of the ore took out \$150. No report is given as to how big the ledge is.

CERRO GORDO.—The work of retimbering the Union shaft at Cerro Gordo is nearly completed. When this job shall be finished it is very likely that the force of miners will be largely increased and the work of developing the mine be pushed vigorously. In the meantime good ore is being taken out of the mine right along, and a 12-horse team is kept steadily on the road hauling the ore to Keeler.

BORAX.—Mr. J. H. Roberts says the activity in borax continues as lively as ever in Saline valley, and he is confident a great deal will be done there during the coming summer.

Kern.

AGUA CALIENTE.—Cor. Kern County Californian, Feb. 15: Agua Caliente is situated about six miles in a southeasterly direction (latitude and longitude unknown to me at least) from Walker's Basin, with Mrs. Scobie's ranch as the central point. It is generally supposed to be a stock-raising country, which it certainly is, and stock of all kinds is looking well. But as a mining country it is slowly but surely coming to the front. Messrs. McKay and Stuter are working four men on the Juan Doisa mine, and are down 150 feet with the ledge improving every foot in depth, the ledge being from two to four feet in width at present. Hugh Mann has retired to his ranch to recruit after a hard and profitable summer's work on the Mace and Janett mines on the south side of Piute Mountain. Mr. Sower and Mr. Blank are running a tunnel on the Brogan mine about two miles from Scobie's ranch. They are in a distance of 100 feet, with very encouraging prospects. Mr. Berry has located the Little Joker near E. R. Peek's ranch, and has started a tunnel. He has found some good prospects. Mr. Ahern has returned to Kern with three partners, all expert miners from Arizona. They have located what is known as the Herbert mine, about three miles northeast from the Indian Rancheria, and have run a tunnel into the ledge which is looking well. They have also found a new ledge with a continuous pay chute on the surface for a distance of 400 feet. They have sunk a shaft 150 feet. Messrs. Miller & Cauty have relocated the old Helmes' mines from which a considerable amount of good ore has been taken in the past, and in which there is good reason to believe plenty more exists.

Napa.

QUICKSILVER SHIPMENTS.—Calistogan, Feb. 12: During the month of January, flasks of quicksilver produced at the mines were shipped from Calistoga as follows: Napa Consolidated, 215; Bradford mine, 125; Great Western, 55; Sulphur Bank, 90; total flasks for month, 485.

Nevada.

THE HOMEWARD BOUND MINE.—Tidings, Feb. 15: We are informed by Mr. J. M. Lakeman that he has received a cablegram from a syndicate having a bond on the Homeward Bound mine, Allison Ranch, to the effect that the purchase will be made. The bond expires March 1st. The Homeward Bound is situated this side of the Hartery, and is separated from the Omaha by the Illinois ground. It is a property that will pay to develop.

WATER.—Tidings, Feb. 17: "Small wonder that the North Star has a large quantity of water to contend with," said a miner to the reporter. In the New Rocky Bar shaft the water is from 60 to 80 feet perpendicular above the New York Hill drain tunnel, which, as reported by the Tidings, has been blocked by a cave or caves. The water is now forced over a "hog's back" and through a crossing into the North Star. Why, enough water can go through that seam or crossing to keep a 12-inch pump busy.

NORTH STAR.—Grass Valley Union, Feb. 15: It has been a hard fight against the water in the North Star, which is supposed to have been receiving a large amount of water from the New York Hill mine, by means of a "crossing" through the country rock. The drain tunnel of the New York Hill mine is caved, which prevents the surface water from being drained off. The water in the North Star mine is being held, but not much progress has yet been made in lowering it.

REDUCTION WORKS AT GRASS VALLEY.—Union, Feb. 15: There is a strong probability that in the near future reduction works will be established at Grass Valley for working the mineral ores of the district which are not free milling, by what is known as the "Pollak Process," which is claimed to be an improvement on the "Newberry-Vautin Process," of which mention has heretofore been made, and the proprietors of which have for the past year been considering as to the erection of a plant here. The "Pollak Process" is held in Scotland, and a request has come from there that ores and concentrates from the North Banner mine, which carry both silver and gold, be sent for a practical test, which will be complied with at once, as the offer is made to bear the cost of transportation. The machinery that will be used for a permanent plant will be heavy and manufactured in Scotland, and inquiries have already been made as to the mode of transpor-

tation, whether by sea or have it sent across the continent by rail, which looks as if the company is ready for business as soon as it is satisfied that the ores of this district can be advantageously worked by that process. The district needs reduction works, as at the present time a large amount of concentrates are shipped off to different points to be manipulated, and this has to be done at considerable expense in the matter of freight and other charges, that could be saved if they could be worked at home. The establishment of reduction works here will be money saved to mine-owners and will have the effect to stimulate vein mining.

THE MENLO MINING PROPERTY.—Grass Valley Union, Feb. 18: St. Louis and London parties have had a working bond on the Menlo mining property of this district for some time, and the date for the commencement of work was to expire on the 1st of March. The owners of the property are James M. Lakenan, M. C. Taylor, Henry Silvester and Peter Johnson, and within a few days they have been advised that the bonders will comply with the terms, and will have a representative here before that date ready to commence operations. The bonders will then have about 15 months in which to satisfy themselves as to making a final purchase of the property at the price agreed upon. They are held to expend a certain amount of money monthly during the life of the bond. The Menlo property consists of the Homeward Bound and Illinois and Wisconsin locations, being on parallel veins. The Homeward Bound is on the same vein as the Lone Jack and Hartery and lies between them. A good hoisting and pumping plant is on the mine and the incline shaft is down about 250 feet. The mine has been standing idle for some years, but the machinery is in good condition and the shaft is also, except that the dirt that has accumulated will have to be cleaned out. As the mine is filled with water, the condition of the drifts is not known, but as the ground is firm there is no reason to suppose that any serious caving has taken place. It is presumed that the work done at present will be principally upon the Homeward Bound. The Wisconsin vein was worked many years (up to 1866), the incline shaft being put down 225 feet, and yielded first and last a large amount of high-grade rock, varying from \$18.50 to \$76.25 per ton. The sulphurets were also of high grade. The Wisconsin is considered valuable, but it needs a considerable outlay of money to put it in working shape.

San Bernardino.

VICTOR.—Los Angeles Herald, Feb. 15: From reliable information just received we are able to report the construction of a 10-stamp gold-mill at the town of Victor, on the Santa Fe railroad, by Messrs. Urban & Garbutt, citizens of Los Angeles and gentlemen of experience in mining and milling business. It is expected the mill will be completed and in full operation within the next 40 days for crushing the ores of the Side-Winder mine, distant nine miles from Victor in the Silver Mountain mining district. The site for the mill was donated by Judge Widney, who laid off the town. From all reports this camp has a very promising outlook. It is also reported that an English company is to put up a mill about 25 miles from Victor, in the Holcomb mining district, to work the ores of the Black Hawk mines. Machinery will also soon be built on the Morongo mining property, 28 miles from Victor, in the Morongo district.

San Diego.

JULIAN.—Sentinel, Feb. 14: Mt. King of the Owens is busy getting in timber preparatory to starting up the mine again. We were informed a couple of weeks ago that work was to be resumed on the Kentucky mine on the 7th of this month, but the owners have not arrived as yet. Messrs. Lane & Smith of Pomona returned on Wednesday and work on the Cincinnati Belle mine will be resumed.

BANNER.—Bryan Ohear, of the Kentucky mine of Banner, writes from St. Louis, Mo. for more samples, which were forwarded yesterday. He says they will commence operations on a large scale by the 15th of March.

Shasta.

SQUAW CREEK.—Cor. Redding Free Press, Feb. 10: Owing to the recent severe storms, the Uncle Sam M. Co. was compelled to suspend operations for a time. The power drill in the James tunnel is in successful operation, and much better progress is being made. During the last month several snowslides occurred, one of them taking the Clipper mill down the canyon. The Riley and Snyder mines had to shut down on account of not having provisions to last during the snowstorm. S. J. Johns, superintendent of the Uncle Sam mine, has returned from the Eureka mills.

LOWER SPRINGS.—Cor. Shasta Democrat, Feb. 16: The party who purchased the B. Swasey mine is here awaiting good weather to commence the erection of a mill on the property. It is understood here that the Hartman M. Co. have let a contract to parties who will drift for the ledge which is supposed to be somewhere near the present tunnel level. The latest report is to the effect that a rich seam of gold quartz has been found near the main tunnel. The tunnel that is in progress on the old Gage place south of the Swasey mine is in 160 feet. The company expects soon to encounter the ledge. Mr. Halley appears to have a good many claimants to his little mine to contend with. The strike has panned out nicely in the last two months. Some of these claimants demand half of the stuff Halley has taken out and others have ordered him off the ground. Such bluff games are often practiced on honest miners who are fortunate enough to find a rich deposit.

Sierra.

CRUSHED BY SNOW.—Mountain Messenger, Feb. 15: The hoisting works and other buildings at the Alaska quartz mine, Pike City, were crushed by the recent heavy snowfall. The middle building at the Primrose mine is crushed in on the east side by the snow, but no very great amount of damage has been done to the property.

Trinity.

NEW RIVER.—Trinity Journal, Feb. 15: Frank Ladd came in from New River to-day. He informs us that John Lewis, who kept a boarding-house at that place, was killed by a snowslide on Jan. 10. Everything is quiet in the camp at present, although Ladd & Clements and the Ridgeway Co. are working their mines, and two men are at work on the Uncle Sam.

NEVADA.

Washoe District.

SIERRA NEVADA.—Virginia Chronicle, Feb. 15: Underground operations resumed Feb. 10. Have repaired the main shaft 120 feet below the 520 level, and at a point 630 feet below the shaft collar are excavating a station on the west side. Operations on the 520 level are suspended.

UNION CON.—On the 145 level in the north lateral drift 100 feet south of west crosscut No. 3, west crosscut No. 4 is advanced 195 feet, and has reached the footwall. Opposite west crosscut No. 4 an east crosscut is advanced 13 feet in porphyry.

MEXICAN.—On the 145 level west crosscut No. 3, 100 feet south of No. 2, from the north drift from west crosscut No. 1, from the main north lateral drift, is extended 63 feet in a porphyry formation.

OPHIR.—On the 1300 level from the end of the east crosscut from the shaft station a south drift is advanced 361 feet, from the end of the east crosscut, 316 feet from the shaft station, continuing in porphyry and quartz.

CON. CALIFORNIA & VIRGINIA.—The 1300, 1435, 1500 and 1600 levels continue to yield the usual quantity of ore. On the 1650 level the raise above the end of the east crosscut from the end of the north drift from the winze, sunk 60 feet below the end of the south drift, is carried up 37 feet, and is in quartz showing some ore. The raise above the end of the northwest drift, from the main west drift from the C. & C. shaft, is up 95 feet and has connected with the winze sunk below the 1500 level north drift, from the Con. Virginia shaft. Shipped to the Morgan mill 1108 tons and 1820 pounds of ore, and to the Eureka 1705 tons and 320 pounds; battery sample assays showing an average value of \$27.65 per ton. Bullion valued at \$53,300 in local assay office.

GOULD & CURRY.—On the 200 level from the southwest drift, at a point 335 feet from west crosscut No. 1, west crosscut No. 2 is advanced 12 feet. Formation porphyry and quartz showing some value.

BEST & BELCHER.—On the 1200 level the north drift is cleaned out and repaired 50 feet. Total distance 245 feet.

UTAH.—On the 600 level the southeast drift from the shaft station is extended 894 feet. Formation soft porphyry, clay and quartz.

OCCIDENTAL CON.—Continue to extract ore of good quality from the slopes on the 400 and 450 levels. The raise 100 feet south of No. 3 raise is up 25 feet and is showing fair quality ore. The 550 level east crosscut is advanced eight feet in porphyry and clay. A south drift from the end of the line west crosscut is extended six feet in porphyry and quartz showing value.

NORTH OCCIDENTAL.—The 550 level joint east crosscut is extended eight feet in porphyry and clay. The north drift from the line west crosscut is extended three feet in porphyry and quartz showing value.

SAVAGE.—Shipped 670 tons of ore, showing an average value of \$23.80 by battery sample assays. Raise No. 1 above the 400 level continues in fair grade ore.

HALE & NORCROSS.—Shipped during the week 860 tons of ore, showing a value of \$19.95 per ton by pulp assays.

CHOLLAR.—During the week crushed 439 tons of ore, pulp assays showing an average value of \$21.75 per ton.

POTOSI.—The 930 level east crosscut continues in low-grade quartz. Repairs to the timbering of the openings on the 630 level still in progress.

ANDES.—Reopening shaft compartments on the 420 level, and timbering station preparatory to drifting northwest for downward continuation of 350 level ore.

IMPERIAL.—The 300 level west crosscut, No. 2, is in porphyry. The 500 level west crosscut continues in quartz. The 500 level north drift is out 1390 feet from the Yellow Jacket shaft.

ALPHA.—The 600 north drift is showing some pay ore. The 500 level west crosscut is in low-grade quartz.

EXCHEQUER.—The 500 level east crosscut at the Alpha line continues in quartz and porphyry.

WARD COMBINATION SHAFT.—The 1800 level east drift is advanced 205 feet.

OVERMAN.—Shipped 200 tons of ore of fair quality. The 1200 level northeast drift is showing good ore.

NEW YORK CON.—Opening a station on the 600 level at the top of the raise above the 800 level.

CALEDONIA.—West crosscut No. 3 continues in low-grade quartz and porphyry.

YELLOW JACKET.—Shipping 80 tons of ore daily of the usual grade.

CROWN POINT.—Shipped during the week 850 tons of ore, showing an average value of \$19.50 per ton by pulp assays.

BELCHER.—The 850 level east crosscut continues in porphyry. The 200 level south drift is in quartz and porphyry. The 600 south drift is out 70 feet.

SEG. BELCHER.—Ore bunches still showing in the 1200 level drift from the winze.

SILVER HILL.—Usual progress made in 160 and 260 level explorations.

JUSTICE.—The mill is crushing 45 tons of ore daily of the usual grade.

ALTA.—Mill crushing a daily average of 45 tons of ore extracted from the 825 and 925 level slopes.

Law's District.

MINERS.—Reese River Reville, Feb. 12: W. H. Williams, who has charge of the Eagle mine at Lewis, wrote to Sam King here for six men to take a contract to run a drift at the mine on fair terms. Sam sends the following miners: Wm. Luke, Richard Burroughs, Andy Erickson, Maurice O'Brien, John Bennetts and W. H. Bennetts.

Tuscarora District.

NORTH COMMONWEALTH.—Times Review, Feb. 14: 1st level: North drift from No. 1 crosscut has been advanced 10 feet and is still showing high-grade ore. 2d level: Joint crosscut has been extended eight feet; face in vein matter giving low assays. Have had to timber, which has retarded the work.

YOUNG AMERICA SOUTH.—Have done more repairing during the past week than mining, owing to the increase of water from melting snow. West drift from west shaft has been driven 53 feet on hanging-wall of ledge, 1st level. West drift from west shaft extended 5 feet on ledge; ore low grade.

GRAND PRIZE.—North 400-foot level crosscut from west drift extended 10 feet. 500-foot level:

West drift on north lateral extended eight feet without change. East drift on north lateral No. 2 extended 13 feet; face showing 14 inches of ore. A crosscut has been started from the north lateral and is in seven feet.

DEL MONTE.—1st level: A drift has been started from No. 2 crosscut to open up ore cut by the crosscut. The ore is high grade. North drift from No. 1 crosscut has been advanced seven feet. The drift continues all in ore; average of first-class, \$10.34 per ton. 2d level: Joint crosscut has been advanced eight feet in vein formation, and looks favorable for ore. 3d level: North drift from joint crosscut has been extended 18 feet, showing quite an improvement in the grade of the ore since last report.

COMMONWEALTH.—1st level: East drift from No. 1 north drift advanced nine feet; total, 61 feet, developing fine ore. No. 10 north drift extended 14 feet. North drift from No. 5 chute has reached the North Commonwealth line and still shows good ore in the face. Upraise from No. 5 chute extended upward 16 feet, total 44 feet; ore in the top is low grade. Dolan drift extended 12 feet; continues to show good ore. 2d level: No. 2 east crosscut has been extended 11 feet in favorable-looking formation. No. 3 east crosscut advanced 16 feet, cutting small seams of ore. 4th level: North gangway has been advanced nine feet; 150 feet has had to be timbered, all of which has been completed, and drifting can be pushed. All the stopes continue to look well. Hoisted during the week 640 tons of ore. Average battery pulp at the mill for the week, \$263 per ton; average battery at concentrating plant, \$19.98 per ton. Bullion shipped, \$35,839.24. The mill was shut down 48 hours to make some alterations in the flues, but is now running nicely and doing good work.

ALASKA.

BEAR'S NEST MINE.—*Juneau Free Press*, Jan. 25: A fine body of quartz has been cut in the long tunnel of the Bear's Nest mine, and good quartz had been encountered in the upper tunnels. The long tunnel is now driven nearly 20 feet in solid quartz, which thus far has given very satisfactory average returns, the quartz in the upper tunnels also assaying well. A survey made by Mr. Bernhardt's engineer along the line of the long tunnel revealed the fact that the tunnel had been stopped under the old management nearly 100 feet short of the vein, and in about that distance a vein of quartz has been encountered. The old management must certainly have been aware of the number of feet of tunnel that would have to be run to reach the vein, as several surveys had been made on the ground, and why the tunnel was stopped nearly 100 feet short is a mystery to many.

ARIZONA.

CHLORIDE.—*Mohave Miner*, Feb. 15: James Cadden has struck a fine streak of rich chloride ore on the Kanawha Belle near Chloride. Thos. MacMahon is about to make a shipment of good ore from his lease on the Prince George. A large shipment of rich chloride ore will soon be made from the Jennie mine in Weaver district. Stephen Smith is getting some very high-grade ore from his tunnel under Serrum this week, and men will continue to be added to the force as fast as room can be made for them. The Esmeralda mine, owned by Otto F. Kuencer and Chas. Gross at Cerbat, upon which Joseph Prisk and Reese Jones have a contract, shows four feet of gold and silver ore in the bottom of the shaft. It is rumored that Heimrod McDuffie and McKinnon have bonded the Sunset mine to outside parties for a snug sum. The bond extends for 30 days, and the owners have a contract to sink the shaft, which is being done as rapidly as possible. The bottom of the shaft shows a six-inch streak of ore carrying much gray copper and assaying from 250 to 9000 ozs. in silver and from 2 to 4 ozs. in gold.

OUTLOOK FOR TUCSON.—*Citizen*, Feb. 12: Tucson merchants are by no means discouraged on account of the outlook for business during the year 1890; nor should they be. Certainly all things are as favorable now for a good business year in Tucson as they have been at any time during the last half decade. The mining camps from which a large share of our trade comes are in good condition, some of them far ahead of what they were a year ago. But one camp is called to mind now that might be said to be in an inactive state; even at the Quijotas work is continued in the mines, and in all probability the mill will again start up soon. On the other hand, good camps that have for several years been dead, have recently sprung into activity, and miners have been put to work and mills to reducing ore to bullion. Business comes to this city from all over Southern Arizona and the outlook for trade is good. The Mammoth bids fair to become the largest camp in the Territory during the next six months, and the Mammoth draws its supplies from Tucson. Whatever is necessary to be done to improve the road to Mammoth should be done by co-operative action among our business men. Good roads are a great help to any city.

THE OLIVE MINES.—*Star*, Feb. 12: News from the camp continues good. Compared with this time last year, a much better showing is made by the various mines. The Olive went ahead of its record last month and shipped 25 tons. The ore is now in the sampler. The owners of this mine sell the ore to Mr. Wores, who ships it to Socorro, N. M. Mr. Messersmith hauled in some ore yesterday. He stores it in his place here in town till he has a shipment. Work on the Annie mine has been resumed. J. Campbell has a working bond on two mines belonging to Y. Johnson, the teamster hauling ore from the mines, and will buy the mines if work he is now doing develops good ore. Other working claims in the district are taking out paying ore. Some that never took out any before are now bringing to light good ore.

COLORADO.

CENTENNIAL.—*Georgetown Courier*, Feb. 14: The Centennial is once more a big producer. A shipment of 25 tons of ore was made a few days ago. It is the intention of the management to continue sinking. H. H. Atkins and L. C. Snyder have leased their Carr mine in Lake district to a pool of practical miners. The Carr at one time was one of Gilpin's most profitable mines. The main shaft on

the Colorado Central is down 420 feet below the Marshall tunnel, or 800 feet from the surface. A new set of levels will be started when the shaft is 30 feet deeper. The Seven-Thirty is turning out immense quantities of ore at present. Tissot & Co., Pulsifer & Co., Gehrna & Co. and J. Griffin have each made carload shipments within the last week. Renneroni & Co. will soon have a millrun of several hundred sacks.

DAKOTA.

THE CALUMET.—*Deadwood Pioneer*, Feb. 15: Our reporter yesterday availed himself of an opportunity to visit the Iron Hill Mining Company's recent purchase, the North Star and Black Sulphate claims, Ruby Basin. The mines, as has before been stated, were formerly owned by the Calumet Company, and are perhaps best known by that name. Of the two claims, by reason of the greater amount of development it has received, the North Star is today the more valuable—indeed there are expert mine engineers who do not hesitate to declare it in their opinion because of the strength and continuity of the ore body, the most valuable mine in Ruby Basin, where are situated some of the best properties in the hills. The mine is worked through a tunnel 400 feet long. From mouth to face this is all in ore, which found first near the surface, dips at a very small angle until when end of the tunnel is reached one is possibly 30 feet under ground. The ore body for the first 100 feet is about four feet thick on each side; after this it begins to gradually increase in size until in the face of the tunnel it becomes rather more than less than six feet thick. Two crosscuts have been made, one 66 feet, the other 48 feet long. In neither of these has either wall been found. The ore is everywhere. On the Black Sulphate, adjoining, a tunnel is now being driven; the ore body was only struck night before last; assays had not been made yesterday, consequently the value of the ore could not be learned. The North Star ore carries both gold and silver, contains some iron and sulphur and is peculiarly well adapted to treatment by pyritic smelting, inasmuch as in it is found at least some quantity of each of the elements required for flux in that process. It is to-day among the best mining properties in the country and will doubtless soon rank with the great producers of the precious metals.

IDAHO.

BIG LOAD OF BULLION.—*Challis Messenger*, Feb. 8: Lawrence Green and Geo. Phillips were in Challis Friday night, from Willow creek divide. From Mr. Green, one of the owners of the Clayton Mining & Smelting Co., we learn that the company has on the road to Ketchum and under his charge over 1100 bars of bullion—about 60 tons—and that he expected to be able to deliver it at Ketchum in about a month. He has nine men and eight four-horse teams engaged in moving it and had nearly all of the bullion on the Willow creek divide at the time he was in Challis. From there he will move it all to Dickey's, going over the road as often as necessary to do so, where it will be unloaded. From there to Riverside in like manner, then to North Fork, then to Summit, then to the foot of the big grade, then to Ketchum. He expects and intends, with this large force of men and teams and by making short hauls and doubling the road so frequently, to deliver that bullion, no matter with what quantity of snow and blockades he has to contend.

WOOD RIVER.—*Times*, Feb. 12: There never was a time in the history of Wood River when the outlook for a prosperous season was as good as it is at present. The Minnie Moore is as good a mine as ever; the Queen of the Hills has just struck another extensive bonanza; the Idahoan shows a 2½-foot vein of high-grade ore which has already been cut and defined on the 600, 700 and 800-foot levels; the Jay Gould has a large quantity of ore in sight; the Red Elephant group shows vast bodies of ore; the Red Cloud has from \$300,000 to \$500,000 worth of ore in sight, with every indication of an enormous bonanza in depth; the Noy Aug mine has a good-sized ore body in sight; the same can be truthfully said of the Emery and War Dance; McFarlane & Mahoney's Abbey is evidently a mountain of ore; the Triumph Co. are anxiously awaiting the reopening of the shipping season to start up their concentrating works; the news from the Carrie Leonard, King of the West, and other Snooky properties is highly encouraging; and the Elkhorn, Vienna, and several other properties are evidently being put in shape to make a good record next season. This for the galena belt mines. But the most encouraging features of the situation are found on the Gold Belt. This important region, which has heretofore only been run over by prospectors, seems to have been at last put in the way of making a showing. The Camas No. 2 mill, when it runs at all, yields between \$200 and \$300 per day, of which fully \$200 would be profit if a sufficient supply of water could be had. The Tip Top mill, though started up at the wrong time in the year, is making a creditable showing; and the Champlain mill, now that the stockholders have stopped quarreling among themselves, will be started up as soon as the weather permits. The Gold Belt has always, and justly, been considered the backbone of this region; and if it can once be started, it will insure a prosperous future not only to Hailey, but to Ketchum, Bellevue, and this whole region.

LOWER CALIFORNIA.

GOLD DUST AND BULLION.—*Lower Californian*, Feb. 12: Alamo has at last begun to pick up in a business way, judging from late advices. The weather is much better than for some time. It will surprise a great many people to learn that in the two weeks ending on the 10th inst., there were \$3000 in gold dust and bullion received by merchants in Alamo in the usual course of business. This is a fact that attests the richness of the camp, when it is remembered that rain and cold weather have greatly hindered work in every direction. Now that spring is near, it is confidently expected that the placer discoveries of last year will be duplicated, not only in the Alamo district, but in all directions, for every prospector knows that Alamo is but one of many sections which are rich in placers and ledges, the discovery of which is liable at any time to create a great excitement. George and Charles Miner run 1670 pounds of ore from their Waldine mine through Lane's mill, on the 3d, which yielded

\$205.04, or at the rate of nearly \$250 per ton. It is the best millrun ever made at Alamo, and will direct attention to the Waldine. The mine is located between the Elsinore and the Iron Mask, and originally belonged to Capt. Frazier, who called it the Annie. The International Co.'s Grandota mine has turned out well—that is, it has turned out as an artesian well, from all appearances. The shaft is full of water, and although attempts are being made to pump it out, the shaft remains full, and consequently no development is being made on the mine. The International Co.'s mill resumed work on the 1st, on ore from the Ciccero, St. David, Telemaco and Spider. During the recent slack period the company has kept a force of swamper at work getting out ore. Quite a number of Chinamen are now at work in the placer diggings between Lane's mill and the Princess mine. Rich silver ore has been discovered on the division line between the Aurora and Princess mines, at a depth of 30 feet. At the upper works on the Aurora the men are down 45 feet. The vein is 1½ feet wide and runs permanent, the grade of the ore being from \$35 to \$10. The lower works have resumed on the old possession shaft, and are under contract to Tirso Martinez, who is working along the 8-inch vein of ore, which is full of galena and free gold. Thirty tons of this ore is now ready to run through Lane's mill. The Aurora has up to date produced 178 ounces of gold. Mathewson & Vaughn, the contractors at work on the Americana, are down 40 feet on the new works. The ore on the dump at the Americana at present is from the 40-foot drift and will average \$30 per ton. Thirty-one tons of ore from the Encantada contract are at Moore's mill ready to be run through. Ten tons of ore from La Flor mine, located in the French camp ten miles southeast of Alamo, yielded \$29 per ton in one of the mills here the other day. The owners had to pay \$10 per ton for hauling the ore to mill. The shaft on the La Flor is down 25 feet.

MONTANA.

THE MOUNTAIN CON.—*Butte Inter-Mountain*, Feb. 11: At the Mountain Con. the company are taking precautions for the future safety of the underground workings. About half a dozen men are loading waste into cars and sending it down into the mine to fill in the many stopes now worked out. About 175 men are employed on a shift, and the company daily hoists about 600 cars of ore. This mine is under the personal management of Joseph Laird.

THE WAKE UP JIM.—The Green Mountain and Wake Up Jim, under the foremanship of Harry Hurley, former foreman of the Anaconda, is giving employment to about 75 miners on a shift at each mine, and sending to the smelter at Anaconda its quota of ores.

THE HIGH ORE is under the personal supervision of Patrick Kane, who formerly had the direction of affairs at the Anaconda, and he is bringing this property up to the standing and capabilities almost of the mammoth St. Lawrence, over which he so long presided. There are about 80 miners on a shift and they hoist on the day shift from 300 to 400 and on the night shift from 500 to 600 cars.

AT THE ANACONDA everything seems lonesome and deserted in comparison with its former life of activity, and no one pursues his calling there except the watchman. The engines are covered with a coat of white lead to insure them from rusting. One thing very noticeable about the works is the strong smell of smoke and gas emanating from the shaft. A hole is cut in the bulkhead of the Anaconda shaft so as to determine the amount of water by a rope connected with a weight attached to it. But the exact amount in the mine could not be learned, as that is kept profoundly secret by the company and its employees.

AT THE ST. LAWRENCE.—Back of the hoisting works are perceived some large cracks about where the old cave occurred some time since. They are open from two to three inches and one could easily drop a wedge into them running from 100 to 200 feet, and the cracks are many in number. Some claim that it is the effects of the extreme cold weather cracking the ground, but as they are directly over that great bulk of timber where the fire was raging, it seems to lead one to infer that it is effected by that cause. The engine is much out of place and before the fire it was the intention of the company to replace it, but from the present state of affairs it will be almost a necessity to reset the bed before any more hoisting of importance can be performed.

NOTES.—The Mountain Con., as well as the other mines of the Chambers syndicate, gave the boys a breathing spell yesterday and last evening. It is stated it is owing to the smelter being out of order at Anaconda. The mines, when in operation, seem to be more than a match for the smelter. The ore bins are all full to overflowing. The Major Budd, which has for a few days past been in a state of suspension, is about to resume operations.

NEW MEXICO.

PIÑOS ALTOS.—*Silver City Enterprise*, Feb. 14: It is said that every mine at Piños Altos, now working, which includes all the prominent ones except the Pacific, is paying expenses and something besides. There are not so many men working in the camp now as there have been during the boom, but more real mining is being done and in a manner much more satisfactory to those interested. There can no longer be a question as to the future of the camp. It has passed through its experimental stage.

BLACK HAWK.—Malcolm McGregor & Co. have got the water out of the shaft on the Good Hope mine and found a three-inch streak of very rich ore in the bottom. They are much encouraged and will sink the shaft as rapidly as possible, preparatory to driving a level for the development of the ore body. On the Red Cloud mine across the gulch on the same vein the lessees are taking out ore of the same high grade. Uncle Ben Hobson has a fine showing for a big mine on the northeast extension of the Red Cloud. At a depth of 40 feet, below the tunnel level, there is a pay streak of 20 inches of ore ranging in value from 100 to 700 ounces in silver, while he is cording up large quantities of 20 to 60-ounce, third-class. Charley Caldwell has a lease at the face of the tunnel and is sinking a winze on the vein with encouraging prospects of striking pay ore. Miller and Dodd, because of sickness in their families, have not been rushing work on their Alhambra mine for the past month, but John Dodd, who is

leasing on a portion of the mine, is extracting a large quantity of the rich ore which has made the Alhambra famous. D. P. Carr has secured from Miller and Dodd a lease for one year on the first 200 feet south of the main shaft on the Alhambra mine. A tunnel has been driven in 70 feet, and Mr. Carr will drive it to connect with the second level which extends 60 feet south of the main shaft. Those familiar with the mine are of the opinion that Mr. Carr has secured a valuable lease. He will go to work on it at once. The leasing system cannot fail to prove a success in Black Hawk and a revival of the mining industry in that camp may be expected at an early date.

A SILVER MILL FOR KINGSTON.—*Shaft*, Feb. 8: Chandler & Daily will remove their mill from Cold Springs, near Hillsboro. To the present machinery will be added settlers, pans, and all the improved machinery used in the successful treatment of silver ores. If the plant now being erected treats the Kingston ores with any degree of success it will determine most favorably the future of Kingston.

SILVER MINING COMPANY.—This mine remains as in the past the greatest silver mine in New Mexico. It is the best equipped mine in the Southwest, and under the management of Walter C. Hadley is paying all the time. Up to date the mine has produced \$9,000,000 of silver bullion. At the present time it is producing 2000 ounces of silver per day without crowding. It has abundant ore reserves, and the production will probably not vary during the year. All the machinery on the mine is now run by compressed air. At the present time 115 men are at work on the mines and in the mills. Peter Kinney, of the Log Cabin mine, visited Kingston during the week, and reports prospects bright. He and his partners shipped another car of high-grade ore last Wednesday. The mines on Trujillo creek are again looking up. We understand that an important sale will be made in that section soon. The Bonanza-Good Hope Mining Company has completed arrangements, and will build a substantial gold mill near Hillsboro, for the treatment of their ores.

A SALE.—*Southwest Sentinel*, Feb. 4: John M. Wright, representing R. F. McComas and others of Nebraska City, has purchased the Last Chance mine, on Silver creek, and paid therefor \$25,000 in cash. This mine is an extension of the Confidence, recently purchased by Denver parties, and is considered a valuable property. Last Saturday Mr. Wright let a contract for the running of a 100-foot working tunnel on the property. He says the ore body is an extensive one, and lies very advantageously for rapid and cheap mining, thousands of tons being in sight. "We'll have a large stamp-mill on the property as soon as possible," said Mr. Wright. Referring to the Silver Creek district in general, he said it was a very promising section, but was sorely in need of a good wagon-road.

OREGON.

THE MINING OUTLOOK.—*Bedrock Democrat*, Feb. 10: The mining outlook for Baker county was never brighter. With the opening of spring, great activity will be manifest in every district of this section. The snow in the mountains which is piled up many feet deep, will afford an abundance of water for the working of the hundreds of rich placers, which for the past two seasons have remained idle, owing to the scarcity of that all-important factor—water. It is true that a large number of our placer mines are supplied with water by ditches and that the output of gold from them last year was great, but with the assurance of an abundance of water, supplied by the deep snows in the mountains, the season will be prolonged and the output from these places will doubtless be manifold. From the different mining camps which are tributary to Baker City come reports that the outlook is most promising. Besides the output from the placers there is every assurance that rich quartz mines in Baker county will continue to prove that the undoubted faith of the owners was not misplaced when they expended thousands of dollars in development and placing extensive plants thereon for the reduction of the ore. Early in the spring the stamps of the numerous mills erected last year will commence falling and will enliven the whole county. A large number of new plants will be erected in the different sections the coming summer, and the prospect for a prosperous year is encouraging to the most sanguine. When the mineral wealth of Baker county is made known to the world, Baker City will become one of the greatest mining centers of the country. It is plainly evident, and it will only take time to prove the assertion, that the day is not far distant when capitalists will see one of the greatest fields ever presented for the establishment of large reduction and smelting works. That it would prove a profitable investment from the start, cannot be doubted. It would afford the mine-owners, who for lack of means are unable to put machinery on their properties, an opportunity for working their ores and thereby greatly increase the output of the mines of this section.

UTAH.

EUREKA.—*Cor. Salt Lake Advertiser*, Feb. 14: The Eagle mine is looking well and promises to rival any of the big mines in time. Chief Gardner has the pipe laid from the Beecher millsite and everything is in readiness that could be done during the bad weather. The hoisting engine will be placed as soon as practicable, and when started will keep a steady stream of ore pouring from the reserves that have been uncovered this past winter. Captain De Prizen is at work on the Solid Muldoon, and like everything he touches, is making a mine of it. It is very strange that more work is not being done here where energy and pluck have invariably been rewarded. Burns & Nelson are at work on the Equator, and expect to strike a bonanza before they reach the 100-foot level. The shaft is showing up some good quartz and metal. Dick Tone is uncovering a strong vein in the Retribution. John R. Davis has quit the Sacramento and is going to work on the Mammoth side for a grub stake. This is a very promising prospect and needs but depth to show up lots of pay ore. Tintic during the week ending February 4d, shipped 1850 tons of high-grade ore. How is that for high? And yet there is but little mining being done. The companies are crying aloud for more cars, and when spring opens will increase the output.

MECHANICAL PROGRESS.

Electric Welding.

Electric welding appears to be making rapid strides everywhere. The process is the invention of Elihu Thomson and was first publicly exhibited by him in New York only three years ago. Since that time its progress has been really wonderful, and it has become very prominent among the rapidly-growing applications of electricity. It was one of the most important features in the electrical department at the late Paris Exhibition. It is now being introduced in England. A late number of *London Iron* says:

"Now, at length we have it in our midst, a practical installation having been laid down in Fanshawe street, Hoxton, London, where we recently inspected the satisfactory working of the system. The principle involved in Prof. Thomson's invention is that of causing currents of electricity to pass through the shutting ends of the pieces of metal which are to be welded, thereby generating heat at the point of contact, which also becomes the point of greatest resistance. At the moment of heating, mechanical pressure is applied to force the parts together. As the electric current heats the two pieces of metal to the welding temperature, the pressure follows up the softening surface until a complete union or weld is effected, and, as the heat is first developed in the interior of the parts to be welded, the interior of the joint is as efficiently united as the visible exterior. With such a method and apparatus, it is found possible to accomplish the welding not only of the common kinds of iron and steel, but of metals which have hitherto resisted attempts at welding, and have had to be brazed or soldered.

"The weld commences at the center of the shutting pieces, and approaches radially toward the exterior. The apparatus is simple, and is in complete control of the operator, who brings the current on and releases it at will, and regulates the pressure brought on the impinging parts of the article to be welded. The time occupied in making a weld varies from a few seconds to a few minutes, according to the sectional area of the parts to be united. The cost is said to be but small in the case of plant laid down for constant use. Of course, if used only occasionally, the cost will rapidly rise, but this is not the intended application of the process. It is specially fitted for use where the operation of welding is being constantly performed, and in this respect it is adapted practically for every class of welding or heating. Pieces of such metals and alloys as steel, wrought iron, silver, copper, brass, lead, tin, zinc, bronze, German silver, platinum, gold and even cast iron, are not only welded to each other, but different metals can be welded one to another in many combinations, extending the applications of the process to the attainment of results hitherto impossible in metal working. The tensile strength of the welds, as shown by mechanical tests, is equal to the very best welding by the ordinary system; in fact, it is superior to it, inasmuch as the risk of dirt and burning is avoided."

We may add that in small and delicate work the current is cut off, automatically, the instant the weld is completed. The welding current is of extremely low pressure, so much so that it is claimed there is absolutely no danger from it, and the machinery may be freely handled with impunity. The process will soon be very generally introduced throughout England and Scotland, and on the continent as well.

The United States Navy Department will no doubt soon introduce it into the various navy yards. The department has just issued an order directing a board of officers to visit Boston to examine into the working of the system, and to report upon the adaptability of the process for welding boiler flues, etc., for use on the men-of-war. Chains used on naval vessels are all made at the Boston navy yard, and it is thought that the new machine will find employment at that station, as the welding can be done much stronger by that means than by methods heretofore in use. The wire used for wrapping the experimental "wire-wound guns" can be much more effectively joined by electrical welding than by any system of soldering so far tried.

WEAR OF TIRES.—Experiments which have been made recently on the Austrian State railroads with wheel-tires of Krupp's crucible cast steel and Martin steel, have yielded interesting results. For the purpose of the trials, three wheels on one side of a locomotive were furnished with tires of one kind of steel, and those on the other side with tires of the second kind. The profiles, to start with, were, of course, exactly alike. After two years' running, measurements of the profiles showed that the Krupp steel tires had worn down, on an average, ten millimeters (about 0.4 inch), while the Martin steel tires had worn down 14 millimeters (about 0.56 inch). Including the weight of metal removed in again turning down the tires to the normal profile, the weight lost, due to wear, was 40.4 kilograms (88.88 pounds) in the case of Krupp tires, and 56.4 kilograms (124.08 pounds) in the case of those of Martin steel.

A MARINE ENGINE WITH EIGHT CYLINDERS. It is said that the well-known firm of Ansaldo-

Bombini, in Sampierdarena, have recently completed the colossal engines and boilers intended for the Italian ironclad *Sicilia*. The engine is constructed to work up to 19,500-horse power, and it is the most powerful engine constructed in Italy. It is constructed on the compound principle, with eight cylinders and four surface condensers. It drives two four-armed screws, which have a diameter of six meters. The weight of the boilers is 500 tons, and the total weight of the engine and boilers is 1740 tons.

Flexible Pitman.

A decided novelty has been brought out and developed in successful operation, and is now being manufactured by the Van Allen Automatic Pitman Mfg. Co. of Rochester, N. Y., by whom the patent is owned and controlled. The purpose of the invention is to supply a pitman which shall overcome the well-known trouble of dead centers, which has long been a perplexing problem. The trouble ordinarily encountered with the dead center is in starting up, requiring the operator to turn the balance wheel as an initial movement. The new pitman prevents not only stopping on a center, but it is also arranged so that a backward or contrary revolution is impossible, hence avoiding the disastrous results liable from such event. The device is exceedingly simple and is designed to supplant the old treadle without necessity of alteration of the machine, and this adaptability is a very valuable feature. The new pitman is something like the old, with about half of the central portion cut out, leaving the crank end and the treadle end projecting toward each other. The space between is occupied by a flat recurved spring, whose ends are respectively clamped to the crank end of the pitman and the treadle end. This forms a spring treadle elastic in the direction of revolution. The pitman stub attached to the treadle is arranged to be inclined back and stayed rigidly, which brings the spring portion to a stress that will prevent the crank from settling on a dead center when stopping. This stress or tension can be adjusted to any desired degree. On the wrist or crank pin is an attachment embodying a small ratchet wheel and pawl, so arranged that the pawl engages the ratchet should the operator start the motion the wrong direction, and this will prevent breakage of the thread or needles. An immense field is open for the introduction of these improvements and large profit is assured.

EDISON AS A THINKER.—We are so accustomed to look upon Mr. Edison as one whose mind is constantly engrossed in some specific work that it is refreshing to be allowed a glimpse of his more spiritual nature, as brought out by Geo. P. Lathrop's "Talks with Edison" in the February *Harper's Magazine*. As a thinker, Mr. Edison is no doubt truthfully pictured as one who can instantly transfer the full power of his creative mind from one subject to another without losing anything by the sudden change; and can, indeed, almost follow out simultaneously the threads of thought on a number of subjects. Mr. Edison makes a sharp distinction between discovery and invention, we are told, and it is as an inventor that he prefers to be known; that is, as one who sets about deliberately to accomplish a certain object, as distinguished from one who discovers, perhaps by accident, what has long been sought for. Very few of his inventions, says Mr. Edison, and those of the least importance, were the result of accident, and most of them were hammered out after long and patient labor, and no doubt often stimulated by the encroachment of rivals. The perfected incandescent lamp, which Mr. Edison considers his most important invention, has been the result entirely of deductive reasoning, in connection with which he has set up no less than 3000 theories to explain the phenomena observed. But in only two cases have experiments proved the truth of the theories assumed. Our readers may also be interested to know that Mr. Edison is a believer in an intelligent Creator.—*Electrical World*.

A STEEL POLISH ON IRON.—Pulverize and dissolve the following articles in 1 quart hot water: Blue vitriol, 1 ounce; borax, 1 ounce; prussiate of potash, 1 ounce; charcoal, 1 ounce; salt, $\frac{1}{2}$ pint; then add 1 gallon linseed oil, mix well, bring your iron and steel to the proper heat, and cool in the solution. It is said the manufacturers of the Judson governor paid \$100 for this recipe, the object being to case-harden iron so that it would take a bright polish like steel.

A MACHINE CHISEL.—While strolling through the Paris Exhibition, Mr. Edison accidentally hit upon a tool that he calculates will save him something like \$6000 a year. It is a chisel worked by hydraulic pressure, and will enable him to reduce his labor by 18 hands.

GERMAN MAKERS assert that their steel engraving tools possess the hardness of a diamond. The method employed is said to be to heat the tools to a white heat, plunge repeatedly into sealing-wax until cold, and then just touch with oil of turpentine.

DON'T use emery to grind in brass cocks; it imbeds itself into the soft brass, and keeps on grinding itself out of true after the cock is put in use. Use grindstone grit; this cuts brass well, and will wash off by using water.

SCIENTIFIC PROGRESS.

Researches in Magnetism.

A paper was recently read at the Royal Society, London, being Part III of an extensive research which is in progress by Mr. Thomas Andrews, F. R. S., Sheffield, on "Electrochemical Effects on Magnetizing Iron." Parts I and II of this work, published in the Proceedings of the Royal Society, contain the results of a study of the electrochemical effects observed between a magnetized and an unmagnetized bar of iron or steel when in circuit in certain electrolytes, and the effect was found to vary with the nature of the metal and solution employed, and also with the extent of the magnetization of the metal. The average result of many repeated experiments showed that a magnetized bar became electro-positive to an unmagnetized one.

Experiments were also made showing that local currents were developed in a magnetized bar between the more highly and less magnetized parts thereof, when the iron or steel rod was immersed in suitable solutions acting chemically upon it. Interesting experiments have also been made in connection with the influence of magnetization on the action of nitric acid on iron and steel. The general conclusion arrived at from the experiments in Parts I and II was that, under the conditions recorded, a magnetized bar was electro-positive to an unmagnetized one when the two were immersed in certain solutions, and that the extent of the result was in some degree dependent both on the nature and strength of the solution, and also on the extent of the magnetization of the metal.

Part III contains the results of a further series of original and interesting experiments on obscure magnetic phenomena. Indications were afforded of the extent of the current flowing between the polar terminals of steel magnets under certain conditions. Mr. Andrews investigated the influence of the earth's magnetism on these reactions, and above a year has been devoted to the study of this part of the subject. In connection with the research, the influence of magnetization on the chemical action of certain solutions on iron and steel has been carefully studied in its various aspects. Mr. Andrews' previous researches on the corrosion of metals during long exposure in sea-water have shown that steel corrodes more rapidly in sea-water than wrought iron, a conclusion which practical experience confirms. It was also made evident that magnetization exerts an influence tending to increase the corrosibility of steel, which metal, as is well known, after once having been magnetized, retains more or less permanent magnetism.

The use of wrought iron many years ago for shipbuilding introduced appreciable causes of deviation in the ship's compass, and observations have been undertaken by naval authorities with a view to obtaining "a clear understanding of the cause of magnetism of iron ships, and the changes to which such magnetism is liable when the vessel's position is altered geographically or in respect to the magnetic meridian." Inasmuch as the power of magnetic retention in steel far surpasses that of iron, it follows that steel vessels may gradually become permanently magnetic from the influence of the earth's magnetism when pursuing their voyages in certain directions. Magnetic influence tends to increase the corrosion of steel, and we may possibly herein find an additional cause of the greater corrosibility of steel vessels, compared with iron ones, when long exposed to the action of sea-water.

IRON SHIPS AND LIGHTNING.—The *Electrical Review* points out that, although the modern man-of-war is not the thing of heauty which was presented by its prototype, it has one advantage at least not possessed by "the wooden walls of old England." This advantage is found in the very few occasions which are recorded upon which the iron-clad ships have been struck by lightning. It cannot be said that the modern vessels are actually exempt from injury by lightning, but they are so far protected by their construction, and the material used in that construction, that when struck the results are trivial, and have often, in fact, been ascribed to the mischievous action of some one on board the vessel. In the old days it was very different; during a period of 50 years 200 ships of our navy were struck by lightning, and in one case five vessels were struck during a single night, the number of fatalities resulting therefrom being considerable.

PHILOSOPHY OF THE EFFECT OF OIL ON WAVES.—In an article on this subject which appears in *Nature*, the writer states that the true part played by this oleaginous film in diminishing the disturbance of the sea seems to be that of a lubricant. Waves are formed by the friction of wind and water. Any force, therefore, that tends to lessen the friction reduces the violence of the waves. This anti-frictional force of oil can hardly be overestimated. The Atlantic waves have been calculated to exert an average pressure during the winter months of 2086 lbs. per square foot. During a heavy gale this pressure is increased to 6983 lbs.; yet the thin oil blanket is sufficient, when applied under certain conditions, to enable a vessel to navigate through them in perfect safety, their oiled summits raising

themselves in sullen grandeur, but never breaking aboard. What the exact coefficient of friction between air in motion and water is, and the proportion of its reduction by oil or other lubricants, are questions that open up a most interesting subject of inquiry, the solution of which will prove beneficial to the whole nautical and mercantile world. The use of oil for the safety of vessels in stormy weather, which was for years ignored by scientists and very generally by sea captains, is now becoming quite general. A Norwegian engineer directs attention to the important point of selecting the most suitable oil. "A fat, heavy animal oil, such as train oil, whale oil, etc.," he says, "is decidedly the best; but as these oils in cold weather become thick and partly lose their ability to spread, it is advisable to add a thinner mineral oil. Vegetable oils have also proved serviceable. Mineral oils, especially refined ones, are the least effective. Crude petroleum can be used in case of need, but refined petroleum is hardly any good at all."

SOME EXPERIENCES WITH ZINC.—Zinc is often used in boilers and hot-water tanks to prevent the corrosive action of the water on the metal of which the tank or boiler is composed. The action appears to be an electrical one, the iron being one pole of the battery and the zinc being the other. Under the action of the current of electricity so produced, the water in the tank is slowly decomposed into its elements, oxygen and hydrogen. The hydrogen is deposited on the iron shell, where it remains. It will not unite with iron to form a new compound, but if any iron rust (known to the chemists as oxide of iron) is present, it will remove the oxygen from this and deposit the metallic iron on the plates. The oxygen of the water that is decomposed, instead of going to the iron, goes to the zinc and forms oxide of zinc, and in the course of time the zinc will be found to be almost entirely converted into oxide, only a small fraction of the original metal being left.

INSECTS IN DRUGS.—At a recent meeting of the Chemists' Assistants' Association, Mr. C. J. Strother showed a number of drugs infected with animal life, and remarked that the first, a fair-looking sample of crushed linseed, supplied about three weeks before by a large wholesale firm and kept in a wooden cask with a cover of wood, was seen under a lens to be literally alive. The next was aconite root, of which the parasite was quite different. Nuxvomica and cantharides were the remaining specimens. With the last named it is usual to put camphor, though with doubtful effect; but it is possible that washing hard substances in a solution of salicylic acid, and quickly drying them, might protect them. The question naturally arises, What would be the effect of a poultice containing thousands of insects applied to an open wound, especially if the poultice be made with hot instead of boiling water?—*Pharm. Journal*.

PSYCHICAL RESEARCH.—The American Society for Psychical Research, after existing for five years, with its headquarters at Boston, and publishing some 600 pages of "Proceedings," at last, for pecuniary reasons, terminated its corporate existence on Jan. 14. The English society of the same name is heir to its documentary possessions, and is to keep Dr. Richard Hodgson, late secretary of the American society, as its own secretary in America. A majority of the associates of the American society have joined the English society, forming the nucleus of an American branch. Prof. S. P. Langley of Washington and W. James of Cambridge, vice-presidents of the English society, form an advisory board in America, but apart from their advisory functions there is no "organization" here, a circumstance which will doubtless contribute to economy and efficiency of work.

A NEW CEMENT.—Prof. Alex. Winchell claims to have a cement that will stick to anything. The recipe is as follows: Take 2 ounces of clear gum arabic, $\frac{1}{3}$ ounces of fine starch, and half an ounce of white sugar. Pulverize the gum arabic and dissolve it in as much water as the laundress would use for the quantity of starch indicated. Dissolve the starch and sugar in the gum solution. Then cook the mixture in a vessel suspended in boiling water, until the starch becomes clear. The cement should be as thick as tar, and kept so. It can be kept from spoiling by dropping in a lump of gum camphor or a little oil of cloves or sassafras. This cement is very strong indeed, and will stick perfectly to glazed surfaces, and is good to repair broken rocks, minerals or fossils.

THE IVORY SUPPLY.—One of the results of the development of Africa will be the increase in the supply of ivory. The annual slaughter of the elephant on that continent at present reaches 65,000. The ivory product is worth \$850,000. With the influx of European capital and enterprise, it is to be supposed that the elephant will be exterminated, as has been our American buffalo here.

THE HUMAN BODY AN ELECTRIC BATTERY.—The French Academy of Science has discovered by experiment that each human body is in itself an electric battery, one electrode being represented by the head and the other by the feet. Therefore it is the thing to sleep with one's head to the north and feet to the south.

GOOD HEALTH.

State Health Report.

The monthly report of the State Board of Health is before us. Its chief feature is Dr. Tyrrall's report on the prevailing epidemic. The report says that influenza, epidemic catarrh or la grippe has prevailed extensively throughout the State from San Diego to Siskiyou.

Reports of a large number of physicians from the interior are given. Dr. Tully, in a letter from Sierra City, says that it is there characterized by its tendency to attack the bronchial tubes and the substance of the lungs, but so far no deaths have occurred from it.

The majority of localities report the disease in a mild form and without fatality. Its mode of attack differs in many particulars. It may manifest itself by sneezing, headache, chilliness, cough, sore throat, carache, vomiting or diarrhea or constipation, fever, dizziness, pain in the limbs or nervous twitching; but none of these symptoms are constant. Heaviness over the eyes, redness of the eye-balls, intense pain in the back, in the limbs and through the muscles, with a feeling of constriction around the throat or chest, are the commonest symptoms observed in la grippe.

Its chief characteristic is, however, the extreme debility and prostration which accompanies its advent. This, with intense mental depression and profuse sweating, protracts the convalescence much longer than it might be supposed; and although the fever, headache and muscular pains last but a few days under proper medical treatment, the heart depression, muscular weakness and nervous debility take some time to overcome.

As the onset of the disease is at present unknown, we can advise no means of prevention, but would recommend that medical advice be sought in all cases, as those suffering from previous diseases or debilitated from any cause are very apt to succumb to a severe attack of la grippe, owing to the intense nervous prostration that ensues, and the tendency to heart failure that always accompanies the disease. Under proper stimulation this may be overcome, but to administer stimulants judiciously requires an educated judgment and a perfect comprehension of the object to be attained.

The average mortality is larger than usual, being at the annual rate of 20.64 per 1000—the largest for many years.

This increased mortality is not so much due to the prevailing epidemic as to a mysterious pandemic influence which renders the human system particularly liable to pulmonary disorders, and particularly fatal to those whose lungs are already diseased or which take on acute inflammation. We find, for instance, that during the month of January consumption was fatal in 270 instances. This is double the usual monthly mortality from this disease, and exemplifies the depressing influence of the epidemic catarrh which is now passing over the State.

Pneumonia caused no less than 228 deaths, which is more than double the monthly mortality.

Bronchitis is credited with 57 deaths, which is also a large increase over former reports.

Congestion of the lungs caused 27 deaths, which is likewise in marked excess of the usual fatality.

Diphtheria and croup caused 40 deaths—a slight increase over the report for December.

Reports received from 93 different localities in the State indicate an extremely limited prevalence of zymotic diseases, such as diphtheria, scarlet fever, measles, typhoid and kindred specific affections, those mentioned being few in number and sporadic in character, whereas diseases of the respiratory organs, dependent in some measure upon meteorological conditions, exhibit a frequency and fatality which is phenomenal in this State. That this is owing to the great pandemic wave of epidemic catarrh which is now spreading all over the State, rendering the populace more susceptible to inflammatory affections of the lungs, may be accepted as the probable explanation of the unusual frequency of the respiratory diseases which have prevailed during the past month. Those suffering from consumption were affected in a remarkable degree, prostration being the most noticeable symptom, and this often so severe that death ensued in a few days.

TEA-DRINKING AND LA GRIPPE.—The French soldiers have been an army of tea-drinkers during the prevalence of la grippe. Whenever la grippe made its appearance in a regiment, all the soldiers who remained free from the epidemic were given between meals hot tea with sugar.

OLD MINE TIMBERS.—Much timber from the old workings of the mines is now used for fuel for the boilers, and recently an assay was made of some of the ashes by Charley Harper, foreman of the Con. Virginia. He found that they went \$40 a ton, and immediately dumped a pile containing about 20 tons into the ore-bins. The old timber, very much of which is compressed by the immense weight it has sustained, has during its years of silent strain absorbed from its surroundings the precious metal in quantities sufficient to make it about the highest grade fuel ever used.—*Virginia Enterprise.*

USEFUL INFORMATION.

A NEW RED GLASS has been recently invented in Germany, and appears to be attracting a good deal of attention. Besides its use for the manufacture of bottles, goblets and vases of various kinds, it will be found applicable in photography and in chemists' and opticians' laboratories. This glass is produced by melting in an open crucible the following ingredients: Fine sand, 2000 parts; red oxide of lead (minium), 400; carbonate of potash, 600; lime, 100; phosphate of lime, 20; cream of tartar, 20; borax, 20; red oxide of copper (protoxide), 9; and binoxide of tin, 13 parts. By a single melting a transparent red glass is thus obtained of a very fine quality, of which various objects can be manufactured directly, without it being necessary to submit the glass to a second heating with the view of intensifying the color.

UNBREAKABLE GLASS.—We find in an Eastern exchange the following account of the manufacture of a substitute for glass that should meet with a wide popularity for many purposes where obscured ground or cathedral glass is now used. An unbreakable substitute for glass is made by Mons. L. C. A. Marguerie of Paris, by immersing gauze in a heated state in a thin paste formed of soluble glass, gelatine and glycerine, or glucose, in proportions varying according to the use for which the material was designed. When nearly dry, the sheets are dipped in a concentrated solution of chrome alum or bichromate of potash. Any desired coloring matter may be incorporated with the gelatine, and opal or other protective varnish may be applied to the "vitro-metallic" panes.

PAPER FOR PILLOWS.—All England is just now crazy on the subject of paper pillows. You tear the paper into very small pieces, not bigger than your finger-nail, and then put them into a pillow-sack of drilling or light ticking. They are very cool for hot climates, and much superior to feather pillows. The newspapers are printing appeals for them for hospitals. Newspaper is not nice for use, as there is a disagreeable odor from printer's ink; but brown or white paper and old envelopes are the best. As you tear them, stuff them into an old pillow-case, and you can see when you get enough. The easiest way is to tear or cut the paper in strips about half an inch wide, and then tear or cut across. The finer it is the lighter it makes the pillows.

MUSICAL GAS MACHINE.—A musical gas machine, called the pyrophone, has been brought out in England. Its compass is three octaves, and it has a keyboard and is played in the same manner as an organ. It has 37 glass tubes, in which a like number of gas-jets burn. These jets placed in a circle, contract and expand. When the small burners separate, the sound is produced; when they close together, the sound ceases. The tone depends on the number of burners and the size of the tubes in which they burn, so that by a careful arrangement and selection, all the notes of the musical scale may be produced in several octaves. Some of the glass tubes in which the jets burn are nearly 11 feet long.

WOOD PULP IN MORTAR.—Wood pulp is now being used as the basis of a plastic compound to serve as a substitute for lime mortar in covering and finishing walls. It is designed to possess in addition to all the desirable qualities of ordinary mortar, the characteristics of being harder, and, when applied to woodwork in a thin coat, rendering it both fire and water-proof.—*Timberman.*

PATENTS.—Last year 20,420 patents were issued in the United States, against 9779 in England and 3921 in Germany.

ELECTRICITY.

DON'T TOUCH AN ELECTRIC WIRE WHEN IT IS ON THE GROUND.—One of the chief causes of accidents from electric wires arises from the ignorance of most people with regard to the circumstances under which the wires are dangerous. The nature of such wires and the circumstances under which danger may be feared should be taught in every school in the Union, and one of the things which should be first and persistently taught is never to lift a wire off the ground, or ever touch a wire anywhere. As long as it is on the ground it is harmless, no matter what pressure may be on it. The moment it leaves the ground it may be dangerous. If it is in the way of traffic you can safely pull it across the street with your foot, then put your foot on it and hold it on the ground and it cannot hurt you; but do not lift it. Never touch a wire tied on a pole. It may not be dangerous, but it is like the unloaded gun—it may kill you.

HOW TO MAKE A STORAGE BATTERY.—A simple and effective storage battery may be made as follows: Get two half-round porous cups and a round glass jar large enough for the two porous cups to stand in upright. Get two plates of sheet lead one-sixteenth of an inch thick, wide enough to fit the half-round side of the porous cups and deep enough to come an inch or so above the top edge of the cups and

jar. Solder a stout copper wire or a screw post to each lead plate at the top. Place the lead plates in the cups and fill the cups nearly full with a paste made of red lead mixed with a solution of sulphate of soda thin enough to run like a cement. The glass jar containing the two cups should be filled to within half an inch of top of cups with sulphuric acid and water, about one part of acid to eight parts of water. One plate should be marked X, so that in charging, the current will be correctly connected. This may be charged by attaching to a series of a dozen enlithate of copper cells for 24 hours or from a dynamo. It should always be charged in same direction, and it will improve by repeated chargings. A wooden cover may be fitted to the glass jar, and evaporation of the fluid should be replenished by adding water. Two or more cells of this battery will work small motors, lamps and induction coils, and if thoroughly charged, will retain a large volume of electricity for considerable time. After once being well charged, four to six cells of sulphate battery will recharge it.

ELECTRIC LAWS AND SNOW.—The last snow-storm in Boston afforded an opportunity for the practical demonstration of the utility of the new electrical sweeper for street-car tracks. It did its work rapidly and well, the only apparent drawback being the fright with which it inspired horses. This was common with car-horses as well as those attached to private vehicles, and will doubtless wear away as did the equine surmise at the sight of the electric cars. The new sweeper leaves the snow just outside the rails, and gathers no accumulation to form into slush for the discomfiture of pedestrians. The electric cars all made good time, being delayed only by horse-cars.

SOLDERING BY ELECTRICITY.—A late invention of Chas. E. Carpenter, a Minneapolis electrician, is an electrical soldering rod, which, he claims, entirely does away with the many annoyances attending that tool at the present day. One advantage is that it can be made much shorter without the heat being felt by those who handle it. Another advantage is that it never cools off unless the connection is broken. It is intended for use in large tin-smith shops, where many are constantly employed.

AN ELECTRIC STAMP to control the payments in banks, hotels and other business places has been invented. It works automatically and is said to be a good detective and preventive of mistakes.

THE ELECTRIC LIGHTS have reduced the average time of vessels passing through the Suez Canal from 37 hours 57 minutes to 22 hours 32 minutes.

DRILLING BY ELECTRICITY is said to be a great economy over the ordinary use of compressed air for such a purpose.

THE BUILDER.

Changes in Building.

Even the most casual observer must have noticed the changes which have been going on for several years in the choice of building materials and in the methods of construction adopted, especially in metropolitan edifices, both for business and residence purposes. Wooden timber, and brick and stone veneering have largely fallen into disrepute, and iron, steel, granite, marble and terra cotta have usurped their places. The modest five and six-story business block has given place to that of 12 or 14 stories high, and men and women now do business, as Shakespeare said, "between heaven and earth," suspended in elevators, or making fortunes, in departments the windows of which overlook the entire city. This may be called having "a splendid outlook."

But the transformation in building has by no means been confined to office structures. The modern dwelling no more resembles the old-fashioned home than the "Tacoma" does the country store at the "corners." The interior as well as the exterior characteristics have been changed. The new has "rung out" the old, and the difference is immense, as to comfort, convenience and elegance—not forgetting the increased expense, which is an important element in the erection of palatial homes.

It is not of these, however, that we would write. There are houses needed for the workmen and for salaried residents. For these there is the choice (in suburban towns) of wooden materials, sheathed with wood and plastered inside and out, or covered with corrugated iron, sheet iron, or metallic shingles, and brick and mortar. Cunningly devised shapes of houses are popular, and too often too expensive for the man of moderate means; but almost any house-holder can afford to erect a "balloon frame," sheath it with boards, and cover them, roof and all, with the cheaper grades of sheet iron, which, when nicely painted, will resist the weather and secure dryness and comfort, especially if properly hoarded and plastered inside.

For external ornamentation the outer covering of sheet iron may be diversified with a tasteful arrangement of metallic shingles in fancy forms and painted in various colors.

THE SLIDING DOOR NOT KNOWN IN EUROPE.—It will be news to most American readers that the sliding door, which is now so common and

so convenient a feature of dwelling-house interiors in this country, is as yet a novelty in the Old World. We have it on the authority of an English paper, however, that such is the case. But the journal referred to (*Invention*, London) has at least a correct understanding of the manner in which the modern sliding door is constructed and placed. It is enabled thereby to point out the singular and rather amusing error into which a French writer on dwelling-house architecture has fallen, who says of the American sliding door that "if it could be arranged to slide in the thickness of the wall, instead of outside, it would be perfect, but perhaps this may come in due time." This French commentator must have derived his impressions from some American hook of house plans of extremely ancient date. We have examined the oldest one in our possession, and it gives no hint to so crude a device as a sliding door which slides "outside the wall." If they would always slide with the unobtrusive smoothness rightfully to be expected of them, they might indeed be said to defy criticism.—*Mechanical News.*

HEIGHT AND PROPORTION OF FACTORY CHIMNEYS.—A foreign contemporary calls attention to the fact that the rearing of high chimney shafts in connection with factories, chemical works, etc., constitutes a specialty in building construction, and may fairly be considered as a matter of very considerable economic importance. It is considered a question whether decrease in height of such chimneys may not effect a saving in fuel without impairing general efficiency. Herr P. Huth records a case in which the erection of a new boiler necessitated (after an unsuccessful attempt to raise it) the demolition of the old chimney, the dimensions of which were: Height, 65.61 feet; lower diameter, 19.68 inches; diameter of interior of chimney, 13.78 inches. The entire length of the draught, including the flue, was about 98.42 feet. For experimental purposes, a trial was made of heating the boiler when the chimney was 39.37 feet in height. Although the results were affected by the damp masonry, there was a distinct improvement perceptible as compared with the old chimney. At a height of 45.93 feet the trials were still more satisfactory, and at 52.49 feet, all requirements were completely fulfilled, the smoke being absolutely white and sometimes scarcely noticeable, without any soot or flying ash. The heating of the boiler was excellent, and the consumption of coal 15 to 20 per cent less than was the case with the old chimney. The chimney was then finished in the usual way, without any further improvement or addition to the height. From these facts Herr Huth deduces the fact that not only the height, but also the diameter of a chimney in proportion to its height, demand attention for economic and administrative reasons. High chimneys are, he considers, as a rule, too narrow in proportion to their height, and hence do not draw well, or else waste fuel and cover the neighborhood with soot and flying ash. The effort to remedy these evils by still further increasing the height of chimneys leads to their aggravation.

Postal Telegraphy.

The Postmaster-General appeared before the House Committee on Postoffices and Post Roads on the 11th and discussed the proposition for the establishment by the Government of a limited postal telegraph. He submitted a plan providing for a lease of the wires by the Government for ten years for carrying on the business, and for the delivery of telegrams by carriers in the first delivery following the receipt of telegram.

The scheme, he insisted, was practical and free from objections. He proposed the union of the post and telegraph on a basis that would not interfere to any appreciable extent with existing rights, but would offer an incalculable service to classes not now enjoying the use of the telegraph to any large degree. He asked that he be directed to negotiate for and secure a set of leased wires such as the great newspapers have from city to city, or the brokers and bankers have connecting their offices and different cities, that the public might communicate through their business offices (postoffices) from city to city, or by messages dropped in their mail-boxes. The people had now, he continued, business officers and clerks who could soon learn the tick of machines, carriers who traveled over the same streets traversed by telegraph boys, and stamps for payment, that dispense with bookkeeping, and all that was needed to build up the service was the authority and the wire. He declared emphatically that such a service was the legitimate work of the postoffice, and the people were right in stoutly demanding telegraph facilities at postal stations. Nothing in the proposed bill is to be so construed as to prohibit any telegraph company from performing general business for the public as the same is now done.

Postal telegraph charges in any one State shall not exceed 10 cents for messages of 20 words or less, counting address and signatures, nor over 25 cents for any distance under 1500 miles, nor over 50 cents for any greater distance; rates and rules and regulations to be prescribed by the Postmaster-General. The bill also provides for the establishment of a system of postal telegraph money orders, at a rate not to exceed double the rate now charged, in addition to the double postal telegraph charge.



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Business Announcements.

[NEW THIS ISSUE.]

Mining Machinery—Vulcan Iron Works.
Books—Henry Carey Baird & Co., Philadelphia.
Chain Pulley—Parke & Lacy Company.
Horse-Power Hoist—F. W. Krogh & Co.
"The Tidings," Grass Valley.

See Advertising Columns.

Passing Events.

We have had another stormy week in California, and again have the trains over the Sierras been blockaded by the snow. Plows and men are working night and day to keep the railroads open, but as one storm succeeds another, the difficulties are gradually increasing.

At Grass Valley the ditches are choked by snow, stopping work at many of the mines. As the mines have now great quantities of water to contend with, the failure of power is very bad.

Already this season the bodies of several miners have been found in their cabins, where they perished from cold or lack of supplies. It is feared that many other prospectors and miners, scattered through lonely places in the mountains, are now suffering.

The strike in the Keystone, reported this week, brings renewed faith in that famous old mine. It was thought to be pretty well worked out, but present prospects indicate to the contrary.

A VERY rich strike in quartz has been made in the Texas and Georgia mine, Old Diggings district, by Hart & Fleming at a depth of 500 feet. This is the deepest find in Shasta county. The rock is said to be rich beyond belief.

Banks and Mining Stocks.

The Nevada bank of this city is to be reorganized, with I. W. Hellman of Los Angeles as president, and that gentleman is reported as saying that he has never in his life speculated in mining stock, and he proposes to keep an argus eye on the Nevada's funds, and that not one cent is to be loaned on this class of security.

This bank was established with money obtained from mining operations—both mining stocks and mines. Its entire capital came out of the Comstock bonanzas. Two of the founders are dead, and the other two are engaged in other operations which occupy all their time. Therefore they retire and give place to new directors and officers who have no sympathy with mining matters.

It seems to us that the members of the Stock Board are themselves mainly to blame for the resolution of the new officers of this bank to refuse loaning on mining stocks. The bank itself in its palmy days must have made money out of its stock operations; it was when it started in on wheat that financial loss and loss of prestige came. This simply shows that mining stocks are not the only outlets for speculation where there is chance for loss.

But the fact is that loans on mining stocks have for a long time been made by the banks more on the commercial standing of the firms or men asking for such loans than on the market value of the "securities." The stocks themselves are not looked on with the former favor. But it is pretty certain that had the Stock Exchange exercised more judgment in its listing of mines this state of affairs would have in a measure been prevented. All sorts of "wildcat" stocks have been put before the public on the same basis as meritorious ones, as far as the Exchange was concerned. That is, the public could see no difference as these stocks were called, bid upon, bought and sold. Being always in the company of thieves, the honest ones were naturally suspected, until all are now looked upon with doubt, and the mining-stock business has gone to a low ebb. Of course, we understand very well that the brokers themselves, or the Board itself, probably had no direct interest in the "wildcats" and paper mines, but their official recognition of them has resulted in deception of the public.

The very natural result has been that the whole business has become one of speculation. As originally devised, the plan was to obtain capital to open, develop and work mines, but it turned into a means of opening, developing and working pockets—not mines' pockets, but men's pockets. True, there were times when the simple mining itself paid well, and in a few instances it does still, but the greater number of the mines dealt in have never been profitable as mining operations purely.

By some prudent care and forethought, the Board lists would have been weeded of the worthless securities which have injured all. Could people know that the Board put its stamp of approval only on properties that had some merit—present or prospective—there would be no difficulty in obtaining money on the stock itself, without the "personal equation" being considered. But the reverse is the case; and now the new president of a great bank that was founded on mines, comes out plainly and says the institution will have nothing whatever to do with mining stocks.

Chinese Gold Mines.

We have before mentioned the gold mines in the Gold Ox mountain, province of Shantung, China. A ten-stamp mill was sent there from this city a few years ago, but now the mines are to be opened on a larger scale than so small a mill warrants. Two Chinamen came over here a short time since and are reported to have sold more or less stock in the company to Chinese merchants in San Francisco. It is also reported that they have ordered a 300-stamp mill of Fraser & Chalmers of Chicago, giving out that they could not get as large a mill as they wanted in this city. This of course is absurd, for the Alaska mill of 240 stamps was built here, and they could have 2400 stamps if they wanted to pay for it. Stamp-mills are built in groups of five stamps each. However, Fraser & Chalmers can build them a good mill and as big a one as they want.

Mr. J. R. Sara of Oakland was one of the experts employed by the Chinese to report on

their mines. He was there in 1888, and says that the mines are in a granite formation, with quartz croppings from 25 to 50 feet in height, 30 to 110 feet thick, and 12 miles long. The average assay of the ore in sight over the entire length of the formation was from \$15 to \$20 per ton free gold. There is an abundance of water at the mines, and fuel can be brought very cheaply by boat from the coal mines of Kai Ping, about 350 miles distant.

The same company that is going to develop these mines has for several years been working mines at Pingtu, in the same province, about 150 miles southwest of Chefoo. They had a 20-stamp mill and a complete California plant, the timber and materials for which were obtained chiefly from the United States. At one time there were ten California miners employed at the Pingtu mine.

No foreigners are permitted to work mines in China or to have any interest in the development of mines, but experts are given good salaries, and the pay is sure. The mandarin in charge of the great project at Gold Ox Mountain is Li Chung Tai, a relative of the Viceroy. The superintendent of the mines is C. E. Taylor, formerly of Fresno county, California, who has been in the employ of the company about three years. The placer mines so far discovered are not rich, and the Chinese who work in the gulches and along the streams near the great ledge of Gold Ox Mountain are content to pan from two hits to half a dollar per day.

Free Lead Ores.

A dispatch from Kansas City says: The city is becoming agitated over the effort of Colorado and Utah miners and smelters who are trying to defeat the free silver-lead ore provision in the reciprocity treaty now pending between the United States and Mexico. It would be a great blow at the smelting industry in Kansas and Kansas trade with Mexico. The largest smelter in the United States is at Argentine and another is building at Lovelace. The defeat of the free-ore provision would shut out the importations of Mexican flux ore and badly cripple, if not destroy, the smelting industry at this point. The Argentine smelter treats two-thirds of the importation of Mexican silver-lead ore, some \$4,000,000 annually. The Board of Trade of this city adopted resolutions asking that the treaty provide for free lead ores. The press will speak in favor of free ore. It is believed that with free Mexican ore this will become the largest smelting center in the world.

All this sounds very well for Kansas, but how about Colorado, Utah, Idaho, Montana and Nevada? What is to become of their mines and miners if this ore continues to come in free? Are these hundreds of mines and thousands of miners to be sacrificed for the sake of building up two or three smelting companies in Kansas? These companies in Kansas and elsewhere are beginning now to show their hands. It has been due to their efforts that the free ore fraud has gone on so long. The smelting enterprises have been wonderfully profitable to the few who own them, but it is time they should give some one else a chance. The thousands of lead miners should be considered before the few hundred smelting capitalists. But the lead miners are organized to fight for their rights, and the smelting men no longer have it all their own way.

If this free ore shipment keeps on, all the lead mines in this country will have to close down, for they cannot compete with the cheap labor of Mexican people. But the owners of the big smelters, as long as they can make money, care nothing at all about our miners, and would prefer to see the Mexican mines worked rather than our own. Such selfish feelings, however, should be promptly rebuked by Congress immediately preventing the further importation of lead ores without payment of duty.

Kindly Remit.

For two months past our agents have been able to do but little service for this paper. Many of our old subscribers seem to have been so completely housed up as not to remit their renewal of subscriptions promptly. With the large expenses we are constantly under for furnishing so valuable and straightforward a journal, we need early payment from all who are in arrears on our list, and will much appreciate all remittances at this time from old and new subscribers.

The Late Thomas Varney.

The death of Thomas Varney of Oakland last week removes from the scene of his labor a man well known to the mining community of this coast since the days of 1849. As the inventor of the Varney amalgamating pan in early Comstock days, he achieved a reputation as an inventor and mechanic; but long before this his friends knew of his ingenuity and skill. At one time he made a complete piano with his own hands. For some time he had a place at the old Pacific Iron Works, where he used to amalgamate and treat lumps of ore for miners, and in this way became well known to the mining community. The constant handling of quicksilver at that time affected the nerves of his hands in a peculiar manner. Some of the features of the amalgamating pan which he invented are incorporated in the present "combination pan" in universal use in silver-mills in this country.

Mr. Varney was one of the first in this country to recognize the merits of nitro-glycerine compounds as blasting agents. He made many experiments with various substances as absorbent of nitro-glycerine, but Nobel's discovery set aside the results of that work. It was, however, due to Mr. Varney that the Giant Powder Co. was formed. He had little means at that time, but his zeal and influence interested Mr. Judson and others who put money into the manufacture of this substance. Mr. Varney afterward went East in connection with the business of making giant powder. He was a director of the company at the time of his death, and also president of the Kennedy Mining Co.

Mr. Varney was always a very active man, and accumulated a handsome fortune, leaving property valued at almost \$1,000,000. He was of sterling character, upright and honest in all his dealings, and popular with all who knew him. Mr. Varney was connected with many mining enterprises in this State and Nevada, at various times, but was always more interested in metallurgical than mining operations. He had a thorough knowledge of the amalgamation of ores, both in theory and practice. Mr. Varney was 71 years of age. He was of fine physique and appearance, and an able and good man in every way.

The Mechanics' Institute.

There is opposition to the regular nominees of the Mechanics' Institute this year, and quite an active little fight is being made. The opposition on Members' ticket is as follows: Chas. L. Taylor, president San Insurance Company; Henry Root, civil engineer; Dr. Benjamin Marshall, physician; A. P. Flaglor, photographer; W. A. Batty, lawyer; Jas. H. Barry, publisher and printer; Chas. Elliot, civil engineer.

The original cause of the opposition is the plan proposed by the present Board of Trustees of putting up a pavilion on the Folsom-street property, and, in place of the present structure on Larkin street, to erect a costly building for a library and renting purposes. To carry out this plan, they must sell the Post-street property and meet the balance required by creating a bonded debt of between one and two millions.

To this plan many object, and the "Members' Ticket" nominees are pledged to the following:

To continue the holding of fairs in the Pavilion on Larkin street until it becomes necessary to replace the same by a more permanent structure for fairs and library purposes.

To sell the Folsom-street property at the earliest favorable moment compatible with the interests of the institute.

To oppose the creation of a large bonded indebtedness for buildings or for speculation in real estate.

To relieve the institute of its present indebtedness as soon as possible, and carry out the objects for which it was organized.

To make such changes in the constitution and by-laws as will prevent quarterly meetings being made packed conventions at times of election.

To abolish the present practice of trustees making awards of prizes to violation of committee reports, which practice is productive of injustice and unfriendly feeling.

To prohibit trustees from making exhibits at fairs for competition.

To increase the supply of books in the library, and furnish greater accommodations for the chess and reading rooms and instruction classes.

MONTANA has more than 12,000 bona fide mining claims recorded. Development work on these claims ranges from \$100 up to a million. Extraordinary activity prevails in the mining industry of the State.

Reopening a Caved Mine.

In last week's PRESS, brief reference was made to the general method adopted for reopening the Tilly Foster iron mine, Putnam Co., N. Y. The plan was very bold in design, and was executed promptly. The mine was worked in a desultory way until the old system of mining could no longer be pursued. The old system consisted in sinking on the ore body from the surface to the 165 foot level, and leaving ore-pillars to support the hanging wall, the vein being over 100 feet wide at this level, and the overhang, in places, nearly 50 feet. When these pillars proved inadequate, and caves occurred, both ore and rock were removed from the pit and the ore assorted on the banks, precautions being taken to prevent, by the erection of dry masonry and cement walls, the spread of these caves at the ends of the pit.

Mr. F. H. McDowell of New York described before the American Institute of Mining Engineers the method by which the mine was reopened, stating that the credit for bringing the operation to success was due to E. S. Moffat, general manager, and Clinton Stephens, contractor.

After the pit was exhausted, new workings were opened below the 165-foot level by means of inclines sunk on the footwall, which has a slope of about 66°. Stations were cut and drifts were run right and left along the footwall at every 100 feet in depth, and crosscuts were made to the hanging-wall, with upraises into chambers, 20 feet wide, leaving pillars 20 feet thick and floors from 15 to 25 feet thick. Then an effort was made to rob the mine of its pillars, first, by springing brick arches at the south end from foot to hanging-wall, to take the place of the pillars, and later, by drawing the ore from the chambers after caves had been developed in both floors and pillars. These

from a vertical position to an inclination of one foot horizontal in six feet vertical.

No difficulty has been experienced in securing good strong natural walls. To remove the ore from the pit, at the surface, steam derricks are used, and across the cut cables are stretched. On each cable is a trolley moved back and forth by a traveling rope. The car bodies are lifted from the trucks and lowered to the pit, exchanged for loaded ones, which are hoisted to

charged to cover the stripping and incidental expenses.

Hydraulicking Slides.

At Tunnel No. 9, near Delta, Shasta Co., on the Oregon line of railroad, they have had a great deal of trouble this winter. The landslides have been of large extent, and hundreds of men have been for weeks trying to clear the

that ordinary hydraulic mines use, but there is little doubt that they can wash away the loose earth faster than they could shovel it.

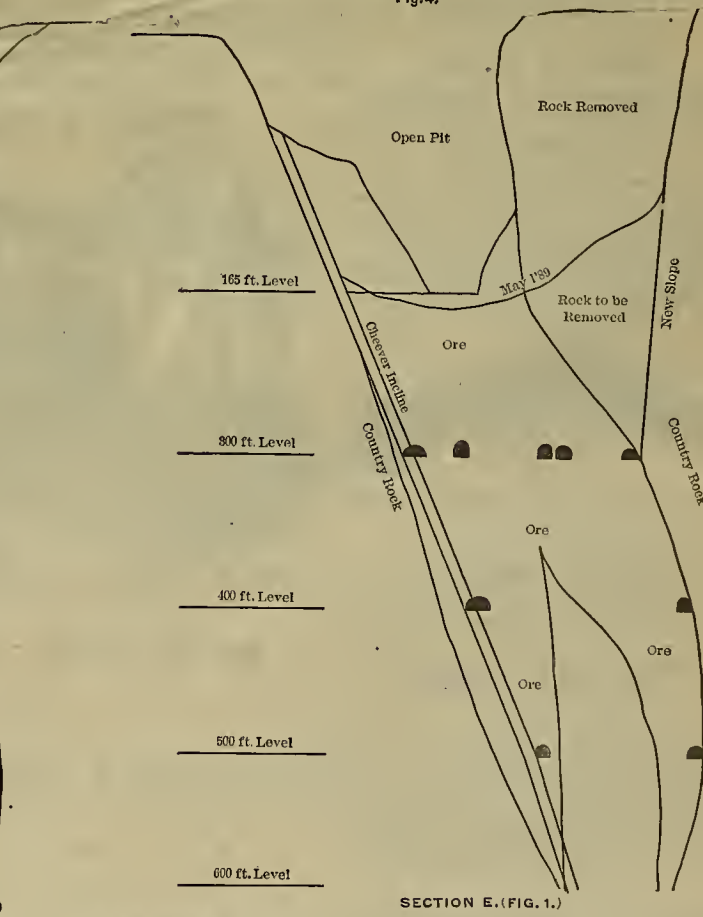
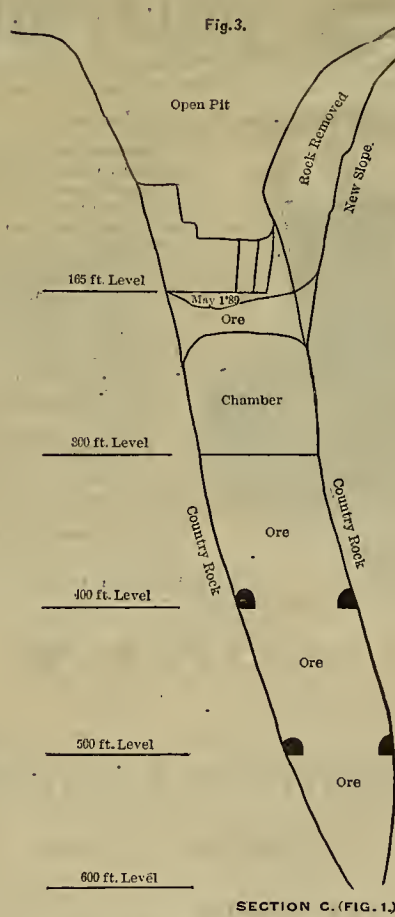
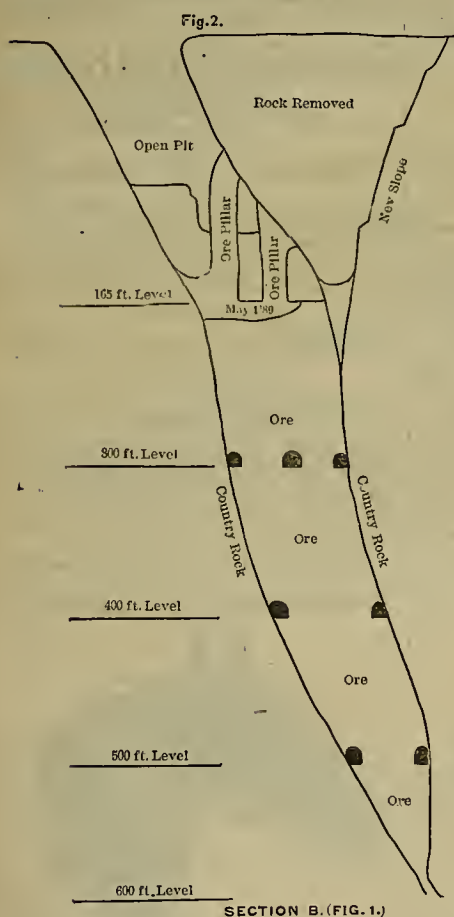
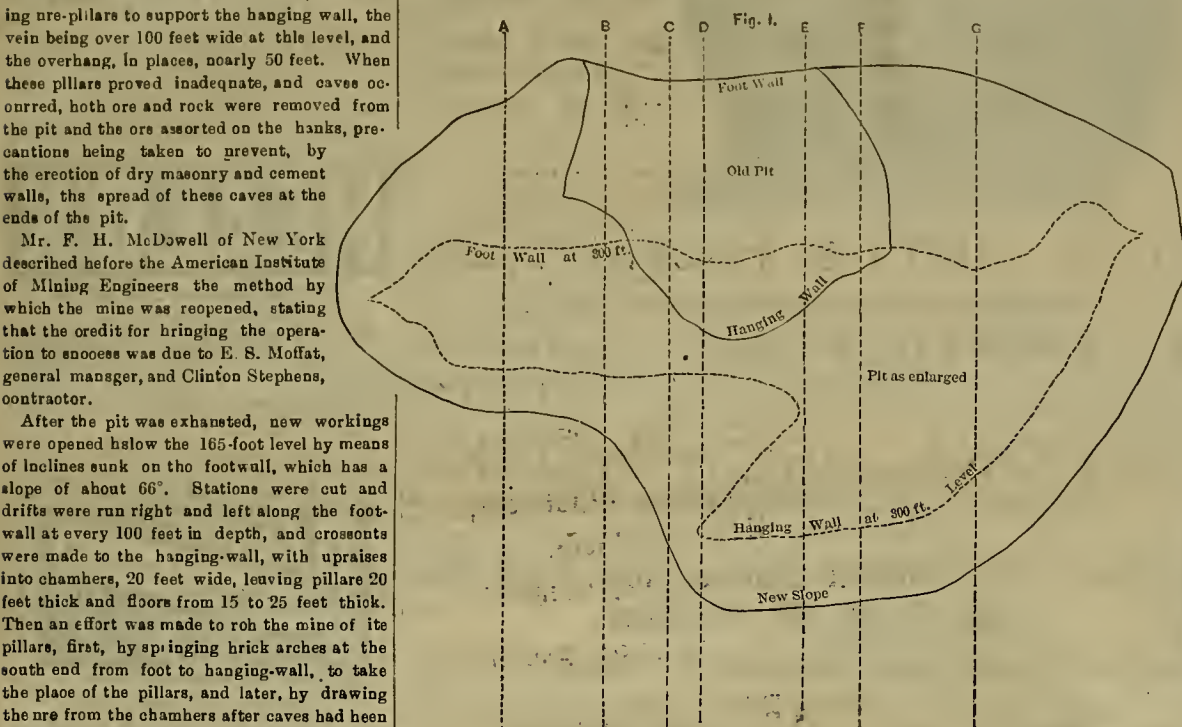
The hydraulic process was used in railroading several years ago on the C. P. at Towles. A big slide of wet, heavy clay which could not be handled by shovels came across the track. The Towles Bros. ran some pipes to the spot and the slide was quickly hydraulicked off.

The Debris Commission.

The U. S. Debris Commissioners have been misquoted in the statements that they are about ready to file their report. One of the Commissioners told the editor of the MINING AND SCIENTIFIC PRESS recently that the report would not be ready before the end of the year. What this report will be of course no one knows, probably not even the Commissioners themselves as yet. Still, as these gentlemen are engineers with no prejudices for or against the conflicting industries, they will look upon the subject from an engineering point of view. This being the case, they can scarcely report that debris cannot be held by dams when they have personally seen great beds of debris behind such dams as have been already built by the miners. The contrary statements of interested and inexperienced persons will hardly be considered of much importance in view of these facts.

Should these Commissioners report that the heavier debris can be impounded and thus be prevented from injuring the rivers, the question of the "riling" of the waters by the lighter material will then be considered. As cultivating the soil, the cutting away of wood and brush, and the tramping of stock all confessedly have their influences also in the muddying of the waters of the rivers, one party to the contest may be held responsible with the other in this regard.

If these engineers are fully convinced, and so report, that the hydraulic mines can be oper-



PLAN AND SECTIONS OF THE TILLY FOSTER MINE.

efforts failed, as did, in turn, every other scheme devised for the extraction of the reserves. The situation called for heroic measures; and the plan finally adopted necessitated the handling of over 500,000 tons of rock, with the expenditure of more than \$250,000.

Fig. 1 is a plan, and Figs. 2, 3 and 4 are sections selected from fifty taken 100 feet apart throughout the length of the deposit. It will be seen that the scheme adopted necessarily involved stripping to the 165-foot level at all points. In some parts of the mine the stripping was even deeper. The new hanging-wall varies

the surface, lowered on the trucks and run out to the dumps. They handle 1000 tons in 10 hours. An engraving showing this method of working was given in the PRESS Nov. 23, 1889, page 391. The shipping ore is now mined by the contractors for from 85 cents to \$1 per ton, the lean ore being delivered to the dump at rock prices, which are from \$1.15 to \$1.45 per cubic yard, according to the level hoisted from.

The undertaking has been based upon the expected recovery of 600,000 tons of shipping ore, against which a royalty of \$1 per ton is

track. Just about the time they had removed the great mass of earth, the rains brought down another slide about as big as the first one. It was then determined to try sluicing the small mountain of earth away by the hydraulic mining process. A complete hydraulic outfit was secured here, and assistant general manager Curtis went up with it. There is no convenient elevated water supply to which pipes can be laid to use the force of gravity, and so a powerful pump will be set up by the river close by to force the stream from the giant nozzle. Of course they cannot get the force this way

ated, with suitable restrictions, and by providing suitable settling reservoirs, they will, doubtless, point out the proper methods of constructing such reservoirs, and possibly the respective places where they should be built, in the case of large mines. Should this be the result, the farmers in the regions affected can scarcely have further cause of complaint, since it is certain that the suggested restrictions would be enforced. In fact, the miners themselves would be glad to take any steps which would permit them to work in such a way as not to interfere with the business of others.

Academy of Sciences.

At the regular meeting of the California Academy of Sciences on Monday evening, Dr. Harkness presided.

T. H. Vail and J. S. Bunnell were elected members of the society, and C. H. Engenmann and Charles Fuchs were proposed for membership. The accessions to the museum were: A collection of fungi from Carl Precht; specimen of *Amblystoma macrodactylum*, donated by Dr. Toland; four shells from Lower California, by T. S. Budgee; insects from Durango, Mex., by C. A. Hamilton, through H. S. Durden; three specimens of *Salmonella* and one abnormal head of a salmon, by Charles H. Ohm; one fossil molar of *Elephas primigenius* from Alameda, by J. L. O. Hamilton.

A paper was read by Dr. H. H. Behr on the genus *Amblystoma* and its allies (salamander, menopoma, water-dog, axolotl), and was illustrated by a rare specimen from the alkaline waters of Medicine lake, Wash., presented by Dr. Toland. The marked discrepancy in the external appearance of the young of animals of this class from the adult ones started a discussion on an analogous discrepancy between the young and adult salmon. In the discussion which followed, Dr. Behr stated that the difference between salmon and trout consisted, in one particular, in that the salmon leads a marine life and spawns in fresh-water streams during the months after Christmas, while the trout, living and spawning in fresh water and only exceptionally entering the sea, has its spawning season before Christmas. This statement was endorsed by Prof. Townsend of the Fish Commission steamer Albatross, who added an interesting observation in regard to the tenacity of life in *Menopoma*, an animal related to *Amblystoma*.

Capt. I. N. Thayer read a paper on modern shipbuilding and the increase of oil-tank steamers.

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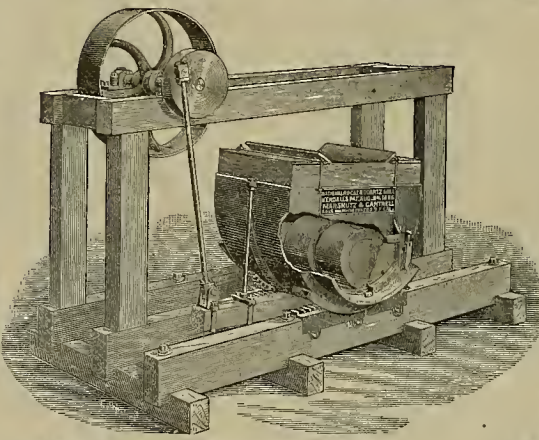
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Washington's Birthday.

It is interesting to notice how much association has to do in giving fragrance to memory and imagination. When the old man goes back to the places of his childhood, he feels young again. No true American can visit the spot on the Lexington common "where the embattled farmers stood, and fired the shot heard round the world," or walk over the fields of Oamden, Monmouth or Yorktown, and not feel afresh the spirit of patriotism stir and thrill him. It is a breath of fresh air from the great mountains. The fact is, there is nothing in history that inspires like a noble personal example. Ideas must be embodied in order to live. This is why we are always looking about for some one a head taller than the rest that we may nominate as our leader in politics or religion. When we find him, we throw up our caps, beat the drum and kindle bonfires. We shall never get over our love of heroes, and hero-worship is a sort of religion. So from the north to the south, from the east to the west, in all towns, and villages, and cities, in schools and colleges, comes the spontaneous homage to that most perfect embodiment of our national ideal, the name of George Washington.

History, which chronicles the long struggle of the Colonies for liberty, records the eloquent words and noble deeds of many a statesman, patriot and warrior, but they all group themselves around this central figure. The history of Washington is familiar reading to every schoolboy, but as we go to press upon the eve of a national holiday, the anniversary of the birth of Washington, we cannot forbear to notice one or two salient points in his character, that should be held in lasting remembrance.

When the flush of feverish excitement, caused by the heroism of Bunker Hill and the Declaration of Independence had subsided, and the haggard face of war became more visible, Washington saw what no one else seems so clearly to have seen at that time, that the success of the Colonies did not depend upon grand strategy, brilliant movements, winning a battle now and then, but on the ability of the people to wear out the patience and exhaust the military resources of Great Britain by delay. This slow, conservative, Fabian policy, as it is called, required a master mind carefully to carry it through. The hope and confidence of the people is inclined to be fickle and can only be kept alive by dramatic movements and dazzling success. Hence the dashing Gates at Saratoga for awhile was the idol of the people. Even many in Congress clamored for his elevation to supreme command. Washington was too slow for them. How his faith and patience must have been taxed during that terrible winter at Valley Forge, or while retreating with his ragged, barefoot army across Jersey before the well-fed and warmly-clad soldiers of Lord Howe. The people were in despair and the soldiers were deserting. The army chest was empty; there was no commissary department. Many in Congress were plotting Washington's supersession. But through all this gloomy period, Washington was calm, serene, and never lost faith in the ultimate triumph of liberty. He paid no attention to the intrigues and slander of his enemies. He had no time nor disposition to counterplot. He trusted the cause. He trusted in the instincts of the people. He was the soul of the Revolution. His personal presence and magnetism was felt from the center to the circumference of the land, cast a ray of hope over all days of darkness, bolder the army and people intact by the majesty of his faith and example, till victory crowned the new-made flag at Yorktown.

We have always thought that the greatness of Washington most fully appeared after the war was over, when the country hung on the ragged and perilous edge of chaos and anarchy. Called to preside over a new Government, fill the office for the first time and put into motion a new piece of political machinery, and that at a time of general doubt and distrust, was a formidable task that may well have awed the stoniest heart. Washington satisfactorily accomplished the task for the reason that he had no sinister aims to secure, no pledges to redeem, no hungry partisans to feed, no enemies to punish. In the formation of his Cabinet, his nominations for the judiciary and all places of trust and profit, he looked over the whole field, sought for the best man irrespective of political opinions.

All we need to complete the glory and prosperity of this land is a revival of that sort of patriotism as characterized Washington, the man "first in war, first in peace, and first in the hearts of his countrymen."

SHOP NOTES.

Something Worth Careful Thought.

There is something worthy of interest and careful thought by every workman in every part of the country. It is a question which is just now greatly agitating the country in political circles; but it is one which is fast being taken out of politics and considered on its real merits. It is to the interest of every workman, and especially to every mechanic, that there should be a steady and the fullest possible demand for labor in every branch of industry. Such a condition can be brought about only by government protection to labor—a prevention of the importation of every article that can as well be made here, even at the cost of a small advance of price.

There is labor in every pound of iron, every yard of cloth, every bale of hemp, flax and wool imported from abroad, and to the extent of such importation is the demand for home labor reduced. Without a tariff the inevitable result will be that the standard of wages paid in this country must be lowered to somewhere near the level of wages paid abroad. This it must be, or no work at all upon such articles as foreigners are willing to make cheaper than we are now making them. Owners of factories, whose products are undersold by cheaper-made foreign products, will go out of business unless wages come down so as to enable them to successfully compete. In the event that they are forced to close, workmen now in their employ will have to look elsewhere for work, and, in getting it, will crowd all the harder the lists of those industries that may survive. This view has both experience and common sense for its support. No matter what free-trade theorists may say, there never has been, and never can be, found any other way of keeping out foreign goods to take the place of those produced by our own workmen except by that kind of protection which actually protects.

The Weight of Machine Tools.

A few years ago there was considerable argument in favor of largely increasing the weight of machine tools, but little seems to have come of this argument. It is safe to say that nine out of ten machine tools on the market to-day are lighter than they should be for the best economy, but builders will go on building light, weak tools, because they will sell. When it comes to putting \$50 more stock in a lathe, for example, the question of getting paid for the extra stock is, in these times of close competition, a very important one. When purchasers are willing to pay for heavy tools, they will find builders willing to make them. But the demand must precede the supply. When it comes to getting hard work out of a machine tool, 10 per cent extra cost does not amount to much, but when it is a question of selling a tool that costs ten per cent more than another, it is uphill business. The manufacturers of machine tools must look at the commercial side of the matter, to the exclusion of other considerations.

A bright manufacturer of machine tools, in England, said, not long since, to the writer: "You in America are neither better nor worse than we are in regard to strength of machine tools, except that I believe that just now we are moving faster in the direction of greater strength than you are." We cannot quote him literally, further, but his argument was to the effect that metal is removed slowly, in machine processes, mainly from the fact that machine tools lack "backbone." And looking at the matter fairly, he was right. His idea—and it is good—was that such tools should be made two or three times as heavy as at present, and that by such construction it would often be possible to double the speed with which work could be machined.—*American Machinist.*

A MACHINE SHOP - ELIXIR.

Wonderful accounts are related of the effect of the so-called "Elixir of Life" alleged to have been discovered by Dr. Brown-Sequard. There is probably a good deal of humbug connected with it, if, indeed, it is not all humbug. But what a great thing for some machine shops would be an elixir which could be injected into the oil-holes of decrepit drill-presses, consumptive lathes and rheumatic planers, and which would renew and revivify them, fill out their skeleton frames into some resemblance to modern proportions, and make them a little better able to compete with their younger rivals! And what a boon such an elixir would be to him who has been employed and placed in a responsible position, in the expectation, on both sides, that methods and processes were to be greatly improved and production cheapened, yet who finds it impossible to convince his employer that, in order to do this, some machines must go to the junk-shop or anvil and be replaced by others of more modern design and better fitted for competition.

ABOUT FLY WHEELS.

The mistake is often made of having a fly wheel too light for its work, says an exchange, and good regulation is almost impossible under such conditions, since when the speed of the fly wheel is reduced, the momentum is not proportionately less varying as the square of its revolutions. In finding

the weight of rim for a fly wheel a certain constant is used, some use 6,000,000, and others give greater weight and some less. The constant used is multiplied by the indicated horsepower and the product divided by the diameter of the wheel in feet times the square of number of revolutions per minute. The general practice is to use a lower constant than above, between 4,500,000 and 5,000,000.

SHAFTING.

Some are fond of turning down the end of a shaft whenever they wish to couple on to one that is of a smaller size, but this is not considered good practice, as it weakens the shaft too much; all the spring and bend comes in the weakest place, and this is found close up to the shoulder where the shaft generally breaks. Better turn a long, tapering neck, or use what is better, a reducing coupling bored out on purpose without the aid of a hushing. Unless every bearing is in line and on the same level, the shafting is being driven as if there was a break on one of the shaft pulleys; the more the bearings are out of true the more the break is at work resisting every effort to turn it, and constant care should be exercised in keeping the shafting straight while any portion of a mill is settling.—*Boston Journal of Commerce.*

AN INVENTOR'S REWARD.

By his rare inventive genius, a Collegeville machinist has suddenly come into possession of a snug fortune. His name is Claus H. Van Hagen, and he has devised a machine to forge twist drills, for which the Chester Twist Drill & Tool Company has paid him \$25,000 in cash and \$65,000 in stock. In addition to this he has been appointed to the position of superintendent of the Chester works, for which he will receive a weekly salary of \$50. He has all his life been a poor man, and during the 13 years that he has been at work on his invention, he has gone into debt to the amount of \$10,000 or more. He is a German by birth, having come to this country 30 years ago.

A GOOD IDEA.

In the shops of Geo. H. Richards & Co., Broadheath, Eng., the holes for centers in the spindles of lathes of a certain class are all made standard size, so that centers are interchangeable, all the lathe being grouped in a few classes as is practicable. When a center in use is sufficiently worn, or is broken, instead of repairing it, the lathe man takes it to the tool-room and gets another. The dilapidated centers are put in shape in the tool-room, being held in a standard hole in a piece that can be attached absolutely true to the face plate of a grinding machine. It is the work of a boy to grind the centers, and a stock of each size is kept on hand.

SELECTING BELTS.

In regard to this selection of belts for various kinds of machinery, an engineer has prepared, in general, the following advice as a result of considerable experience: Belts of a light color should be selected in preference to darker ones. Superior belting having an unmistakable light buff color indicates that it is oak tanned, and that the leather has been thoroughly washed. This removes all matter except the fiber. This light color is an indication that only the best qualities of grease have been used. An inferior quality of grease not only impairs the quality of the leather, but darkens the color.

AN OBSERVING MAN

once noticed a wheel-rig at work with a measuring-wheel who rolled this little instrument around on the outside of a tireless wheel and determined the proper length of the tire iron. From this a wheel bound with leather was devised, so as to be held in a frame and geared up in a manner so as to show the number of feet it had traveled per minute. By holding this on to a belt, its speed was soon determined and a rough estimate of the power transmitted could be deduced upon by considering each inch in width good for a driving force of 50 pounds.

IN FLOUR-MILLS,

it will be found a good plan to set each set of rolls a few feet apart, so as to give a better opportunity to distribute the product among the machines on the upper floors of the building. When the rolls are set too close together, it obliges the machinery above to be huddled together in the same way, which makes it both awkward and inconvenient. For all mills up to 100 barrels' capacity, three double sets of rolls are all that will be used, and there will be plenty of room to spread them apart.

ENGINEER'S SOAP.

It is said that soft soap, with half its weight in pearl-ash, one ounce of mixture in about one gallon of boiling water, is found of great practical value in engineers' shops, in the drippings used for turning long articles bright in iron and steel. The effect of this mode of treatment is that the work, though constantly moist, does not rust. Bright metals, when kept immersed in it till wanted, retain their polish.

COOLING A JOURNAL.

An ingenious way of cooling a journal that cannot be stopped is to hang a short, endless belt on the shaft next to the box, and let the lower part of it run in cold water. The turning of the shaft carries the belt slowly round, bringing fresh cold water continually in contact with the heated shaft without spilling or spattering a drop of the water.

Gold in Suspension.

EDITORS PRESS:—Your article with the above caption in last week's PRESS, conveying the idea that gold does get into suspension, is well timed, and every article on the subject has its value to the miners for the simple reason that it creates investigation. It must ever be kept in mind that each year brings into the industrial mining field a new body of operators who, if they seek to find and realize the loss of metal by our present modes of working, will be commencing in the right direction. I note that you quote Mr. Florence O'Driscoll's mode of ascertaining that gold is held in suspension. In reading Mr. O'Driscoll's book (*Notes on the Treatment of Gold Ores*, published in London, 1889), I was impressed with the following remarks:

"One of the most remarkable features noticeable when dealing with this subject (gold) is that although decades of centuries have passed since history tells us of the methods employed in saving gold, the same principles are still perpetuated, and the fact remains that every piece of gold saved must possess the inherent quality of withstanding a rush of 'water sinking' through it, and amalgamating with mercury, otherwise it will be washed away and practically lost." After quoting largely of many, many tests, as made in various localities of Australia and other countries, as to the loss of gold by our wet system, Mr. O'Driscoll winds up as follows: "From every part of the world where gold-mining is carried on the tale is the same." Is it not remarkable that such is the case when great progress is made and accepted in all things but saving a high per cent of gold? And here I wish to make an unqualified declaration that there never will be a proper percentage of gold saved in our general system of working until this present mode of wet working is abandoned and all handling of gold rock is by a dry way.

For over 20 years I have been experimenting as between wet and dry, and presume to know whereof I speak. ALMARIN B. PAUL.

San Francisco, Feb. 1890.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

FOR WEEK ENDING FEB. 17, 1890.

421,071.—SAFETY BOLT FOR WHIFFLETREES.—P. H. Flynn, Los Angeles, Cal.

421,131.—CHECK HOOK FOR HARNESS.—Geo. E. Foster, McPherson, Cal.

421,211.—ELEVATED CARRIER.—W. P. Walling, Santa Monica, Cal.

The following brief list by telegraph, for Feb. 18, will appear more complete on receipt of mail advices:

California.—Daniel Best, San Leandro, steering-wheel carriage; W. E. Bowers, S. F., rotary pump; E. A. Cochran, assignor of half to E. J. Beach, Pasadena, pneumatic bar treadle; F. W. Cook, S. F., sawdust burner; W. L. Crooks, Sonoma, and J. Robin, S. F., hair restorer; Oliver J. Fisk, Coulterville, whiffletree connection; Taylor W. Heintzelman, Sacramento, drawade; Cyrus Packard, Fresno, guiding attachment for agricultural implements; James Portens, Fresno, raisin-grader; Samuel H. Pratt, Brownsville, shifter for gang-gaders; Henry S. Pungley, Oakland, journal-box protector; Paul Seiler, S. F., visual annunciator for hall boxes; George W. Swan, assignor of a fourth to W. B. Ewer, S. F., mixing apparatus; Sidney B. Whiteside, Los Angeles, duplex ledger ruler; Ruel W. Whitney and B. K. Cowles, S. F., mouthpiece for telephones.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

The Technical Society.

At the last meeting of the Technical Society of the Pacific Coast, Ross E. Browne and Hans C. Bahr read a paper descriptive of experiments made with Dr. Pohl's air-lift pump. The machine consists of an engine, a receiver, an air pipe and a water column into which the compressed air is delivered. The compressed air is delivered into the column in layers lifting sections of water and air alternately.

The paper read was the result of a series of practical experiments made by the authors, and was illustrated by tables and a miniature pump in glass and rubber, showing the results to be obtained with compressed air as a water lift. A large volume of water can by this means be raised to almost any height, the practical limits being 100 feet at a single lift. But successive lifts may be made. There are no pump rods, or bobs, or valves of any kind in this apparatus.

The efficiency of the pump is demonstrated by a table showing that with the piston registering 270 strokes and the compressor working against a temperature of 19.4 degrees, the compressor was delivering to each stroke the great amount of .084 pounds of air, and the efficiency becomes greater with the reduction of the stroke. The authors of the paper were given a vote of thanks.

BELT MOVEMENT.

There is quite a difference in the speed of a belt when measured on the tight and on the slack sides; the tight side moves faster. The difference can be attributed only to the stretch of the belt on the tight side.

The Ellensburg, Wash., Board of Trade has been reorganized, and will endeavor to start up iron manufactures.

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CONCENTRATORS, PULVERIZERS,

TURBINE WATER WHEELS,

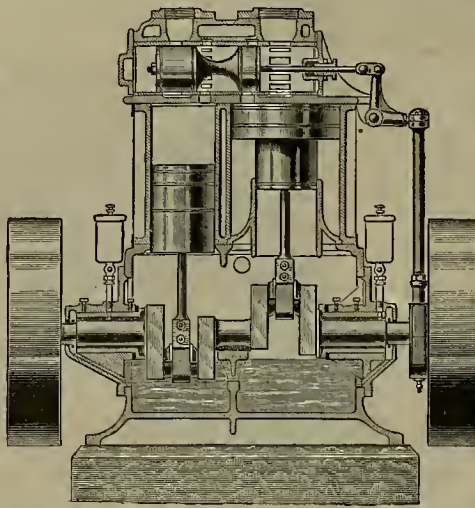
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COMPOUND, 44 ENGINES,
5215 HORSE POWER.

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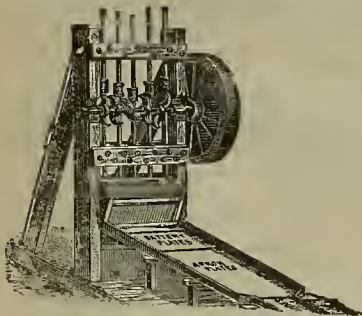
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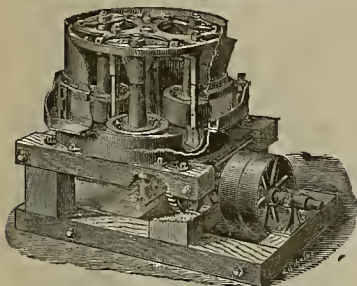
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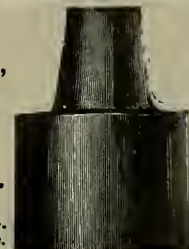
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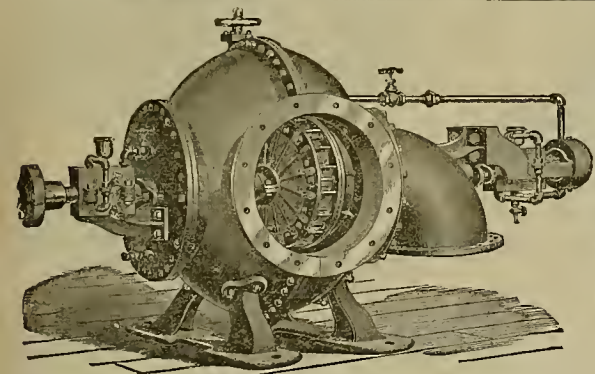
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MONTANA has a population of about 250,000 souls, in round numbers. Of this number, more than 25,000 are actively engaged in the production of the precious metals, while the balance of the population are either directly or indirectly interested in the mining industry.

Inspection of Mines.

EDITORS PRESS:—In your issue of February 8th, Mr. Geo. Kieselburg, Assistant Inspector of Mines of Silverton, Colorado, evidently wishes to be known that he is acting in that capacity, and states that the "writer of the article on 'Prevention of Mine Accidents' is certainly not well posted when making the assertion that we have no Governmental or State officials to inspect mines, etc." If he reads my remarks again of Jan. 18, 1890, he will see I refer directly to the State of California and to no other. My philanthropy is possibly so dulled by the unphilosophical ways of our Golden State that I omitted to mention and quote Colorado, etc., as an exception. However, I apologize for the omission and congratulate those more advanced Eastern States that they do possess such official inspection, thereby seeing to the safety and welfare of their miners. They have thus set a thoroughly good example for us to follow, and I trust our legislators will imitate this much-needed reform in the near future.

"ARGUS."

THE CORTEZ MINE.—A few years ago the Cortez mine, near Beowawe, then owned by S. Wenhan, was considered valueless except by its owner, and it had run him in debt all that he could get trusted. He succeeded, however, in getting his son-in-law, who was a wealthy cattleman, to advance money enough to buy provisions and mining tools until he finally struck ore which paid more than expenses. After he had paid all indebtedness and ran his bank account up to six figures, he went to London, where he incorporated the mine and disposed of a part of the stock, he retaining a controlling interest and the management of the mine. Last year the net profits of the mine were \$247,000, and dividends amounting to \$150,000 were paid the stockholders. The ore reserve is said to be larger than at any previous time, and the Cortez, which some years ago would not sell for a thousand dollars, could not be bought to-day for a million, and it is doubtful if the English stockholders would sell even at that price. Mining is in many respects risky business, but there are not many things, since the breaking up of the Star Route and Naval rings, that pay so well.—*Silver State.*

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A SENSIBLE CALENDAR.—As usual at this time of the year the new crop of calendars is coming in; they are of all sorts, sizes, shapes and kinds, and many of them can be bad for the asking, but the BEST calendar that comes to our office is that published by N. W. Ayer & Son, Newspaper Advertising Agents, Philadelphia, and which they send postpaid to any address on receipt of 25 cents. This calendar is 14x22 inches, the upper portion being beautifully printed in colors, while the monthly sheets are printed with figures so plain that they can be easily seen at a distance. Although the calendar is an advertisement of their ever-growing business, it is at the same time so valuable to those having use for a calendar that year by year the sale steadily increases.

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AN IMMENSE LANDSLIDE at Dixon's Bar on the Trinity river, last week, dammed up the river for some 14 miles. At Wash Henstie's mine, where the house is 150 feet above the river, the water came up to within 10 feet of the door. John Hedges' house, six miles above the slide and 70 feet above the river, was washed away. This slide was the heaviest ever known on the Trinity river. Two Chinamen were killed who were mining on the bar.

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SNOW NEAR DOWNIEVILLE.—From a private letter from the superintendent of the Red Oak mine, near Downieville, Sierra county, we learn that the amount of snow in that section is remarkable. It is 16 feet above the very top of the dump-shed and 35 feet on top of the woodshed. It is 40 feet deep on a level.

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Table of Contents.

The following brief abstract of the contents will give an idea of the branches of the subject treated:

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Any stock upon which this assessment shall remain unpaid on the Twenty-fifth (25th) day of February, 1890, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 17th day of March, 1890, to pay the delinquent assessment, together with the costs of advertising and expense of sale.

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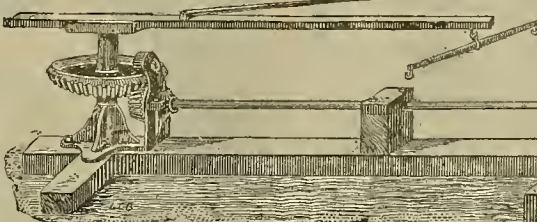
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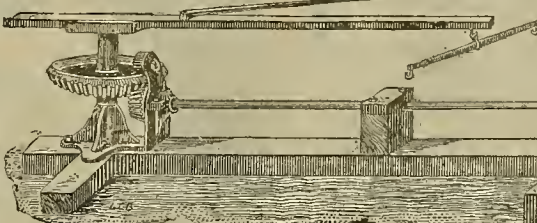
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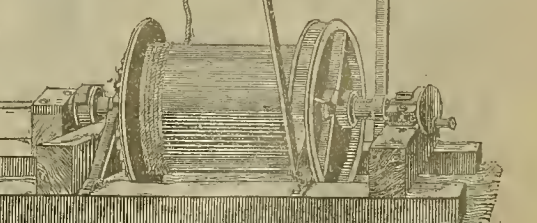
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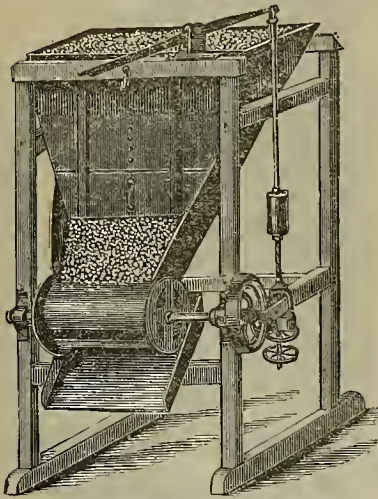
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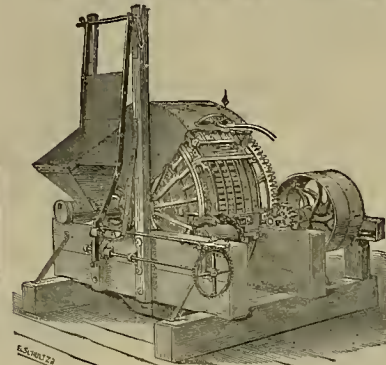
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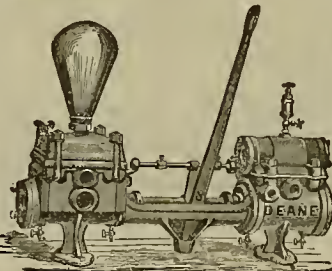
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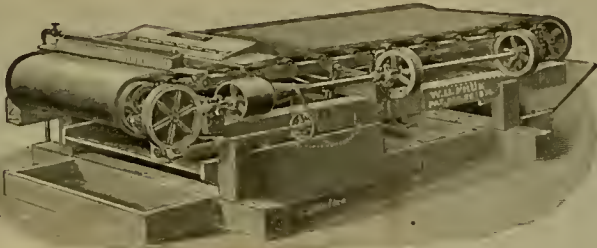
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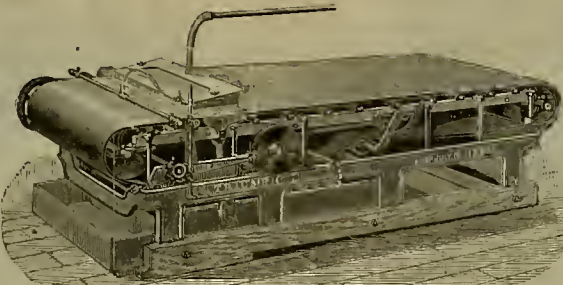
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JOSHUA HENDY MACHINE WORKS,
39 to 51 Fremont Street, San Francisco, Cal.

(PATENTED.)
Both the “Triumph” Concentrator and “Blasdel” (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

Original Empire Mill and Mining Company, Principal Office, 401 California St., cor. Sansome, S. F.
Location of Works, Grass Valley, Nevada Co., Cal.
GRASS VALLEY, NEVADA CO., CAL., Nov. 10, 1885.
Joshua Hendy Machine Works, 39 to 51 Fremont St., S. F., Cal.

GENTLEMEN—I am pleased to state, in reference to the “Triumph” Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.

At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrators is the equal, if not superior to any other style of Vanners or concentrating devices. DAVID McKAY, JR., [Signed]

Sup't North Star and Original Empire Mining Co.
N. B. When the stamping capacity of the two above named mills was increased, more “Triumph” Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.

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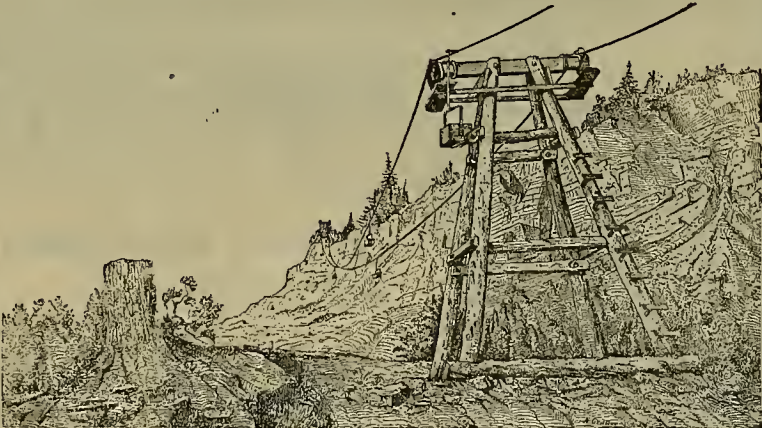
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Erected by Us During the Past Fourteen Years in Spans
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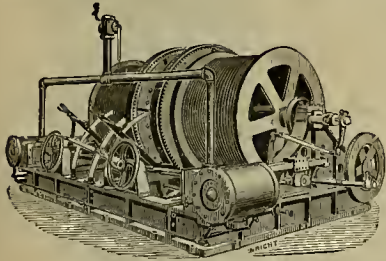
Simple, Economical and Durable.

HAVE BEEN THOROUGHLY TESTED
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1, 2, or 4 Drums, with Reversible Link Motion or Pat. Improved Friction.

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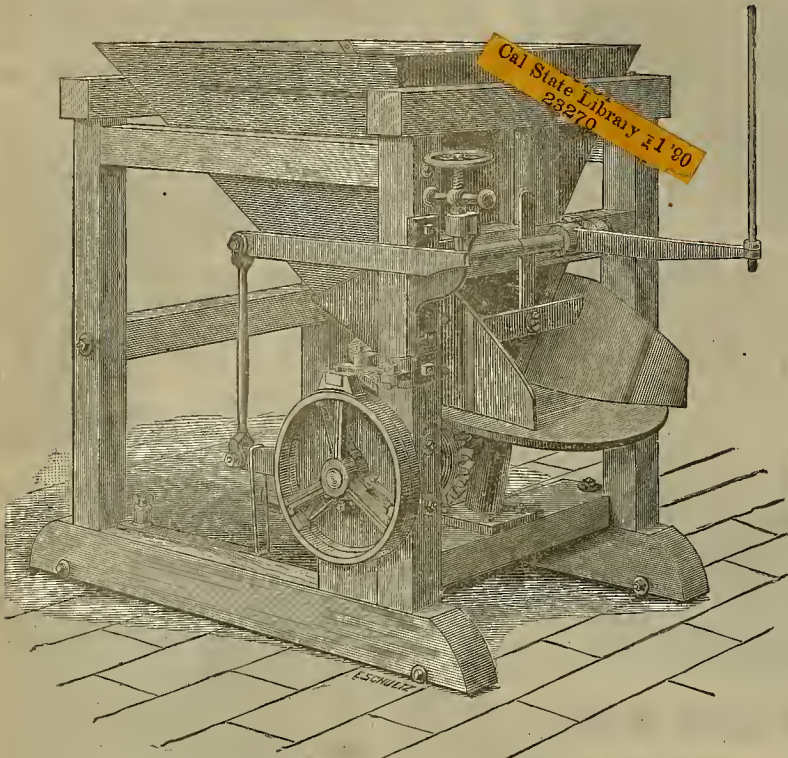
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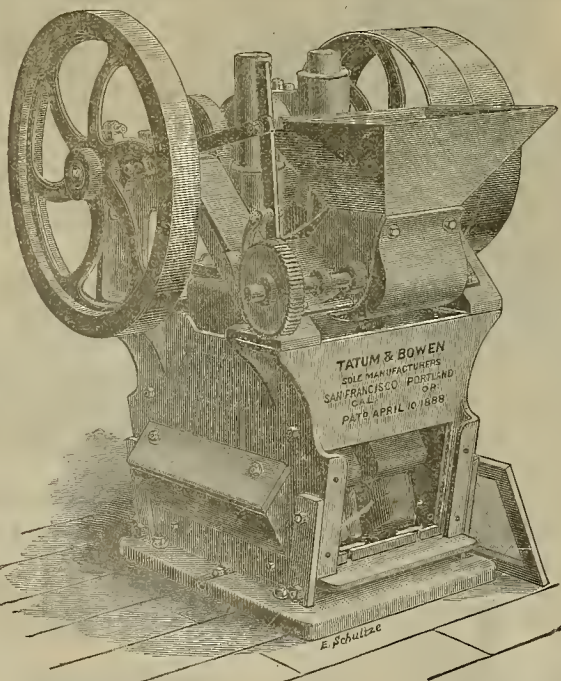
N. W. CROCKER, Supt. Bunker Hill Gold Mining Co., Amador City, Cal. | D. C. WICKHAM, Taylor Mine, Greenwood, Cal.
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It costs less, in proportion to what it will do, than any other mill. There are no working parts to buy for it, no matter how long it is used, except shoes and dies. Capacity of Mill, 9 to 10 tons per day. Weight of Mill, complete, 6400 pounds.

We manufacture, to go with the Mill, an

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Power required for Mill and Rock Breaker, 6 H. P. SEND FOR CIRCULAR. Address

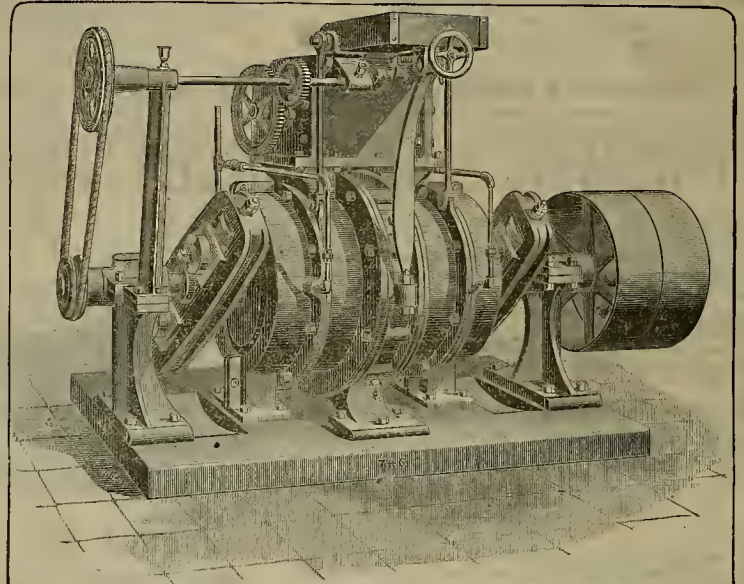
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This Mill, with a weight of less than 9000 pounds, has a capacity of three tons per hour of hard quartz to 40 mesh; has been thoroughly tested; we guarantee its work as represented, and we will give long time trial.



IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS

And renewals will not cost over one-half as much as for stamps. Will run empty, or with small amount of ore without injury. The attention of parties having Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh; 30 to 35 H. P.

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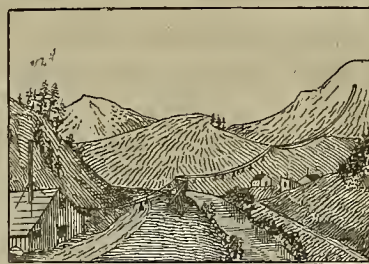
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No Possibility of Load Slipping.

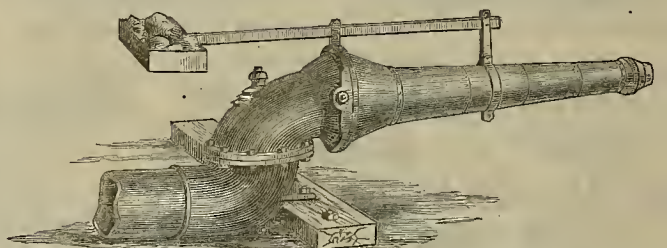
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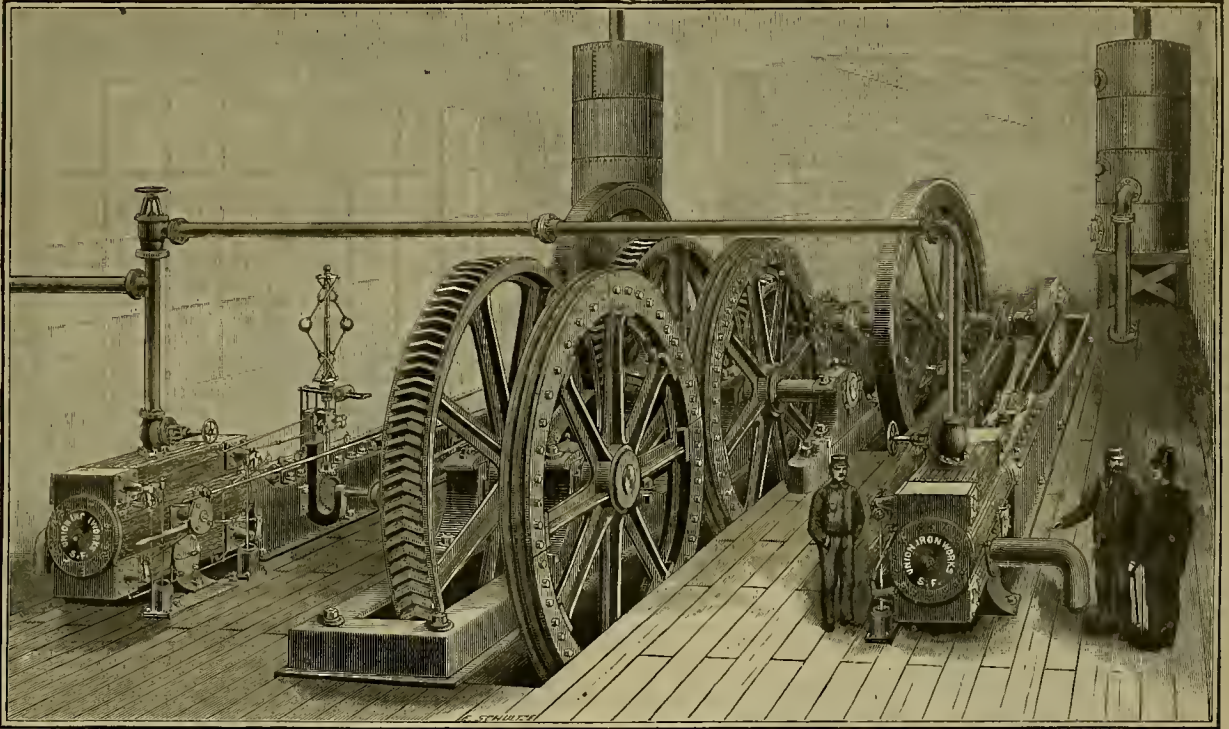
SAN FRANCISCO, SATURDAY, MARCH 1, 1890.

Three Dollars per Annum.
Single Copies, 10 Cts.

Corliss Engines for Cable Roads.

On this page is an engraving showing an application of Corliss engines of 400-horse power for driving the cable gearing of the Hayes-street cable railway. The Union Iron Works of this city have constructed the Market street, Valencia, Haight, Hayes street, McAllister street, Geary street, Sutter street and Howard street cable railway plants in San Francisco, and have the most extensive collection of patterns, drawings and plans for this kind of work that exists in any single works in the world. The steam-power and method of gearing varies in each case, but the results are quite uniform. All the engines employed are of high class, with variable expansion gearing, and in most cases compounded. Those of the Market-street system have an aggregate of 350-horse power, divided into three sections.

The Union Iron Works are prepared to contract for and erect complete works for cable railways in any part of the United States, or in foreign countries, and to guarantee successful working of such plants. This system for modern railways is steadily gaining ground, and is more complete and economical than the horse-car method. The system originated in San Francisco, where there are now 12 lines; and in no case have there



ENGINES AND CABLE GEARING OF THE HAYES STREET CABLE RAILWAY.



WORKING A SERPENTINE QUARRY.

been failures and losses such as have occurred in the Eastern States.

Serpentine Rock.

Inexhaustible quantities of serpentine of a deep green or yellowish color occur in the region around San Francisco, and often in such situations as to be easily available, as at the head of Market street. So far as opened, none of the material is of such a quality as to render it of value for ornamental work, while its gloomy color renders it equally objectionable for purposes of general construction. The rock is also abundant in other parts of the State.

In Pennsylvania this rock is used for building. Quarries have been worked at Chester for 100 years. The accompanying engraving, from Merrill's "Building and Ornamental Stones" (Smithsonian Institute), shows a serpentine quarry. The rock occurs only in a jointed condition, and blocks of large size cannot be obtained. The largest yet quarried was 3 feet square by 16 feet long. It is used in Philadelphia to the greatest extent, but is also shipped to New York, Baltimore, Washington and Chicago.

The little town of Boulder Creek, Santa Cruz county, has had 107 inches of rain so far.



FIG. 1.—Rock Face.

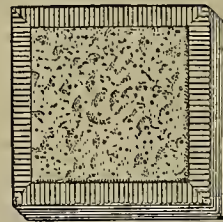


FIG. 2.—Pointed Face.

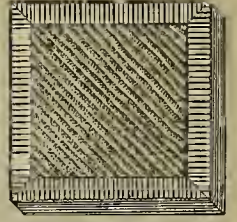


FIG. 3.—Pointed Face.

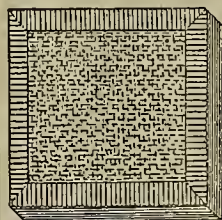


FIG. 4.—Tooth-Chiseled.

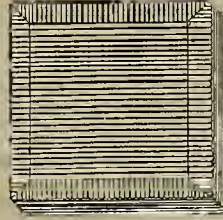


FIG. 5.—Square Dove.

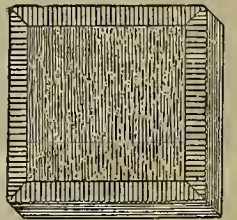


FIG. 6.—Patent Hammered.

KINDS OF FINISH FOR STONE.—See Page 153.

CORRESPONDENCE.

Correspondents are alone responsible for their opinions.

Placer County.

EDITORS PRESS:—Placer county lies in the north-central portion of the State, with a length of 95 miles and a width of 8 to 25 miles, the western or Sacramento basin part containing 675,000 acres, while the mountain or Tahoe basin contains 170,000 acres. The adjoining counties on the north are Yuba and Nevada; south, El Dorado and Sacramento; west, Sutter, while the eastern boundary forms the State line.

The topography is varied, not only in the county as a whole, but on single holdings as well. The level alluvial plains of the Sacramento valley and the rugged mountains are repeated, though on a smaller scale, in almost every mountain range, thus making the county not alone picturesque but affording beautiful and healthful sites for homes, while the elevation secures exemption from damaging frosts and by reason of the greater degree of warmth, produces not alone earlier but much finer fruit.

Products.

By reason of the large fruit shipments the impression is given that fruit alone is grown in the county, and that fruit is the only product. In the old river channels, now sealed up and almost as effectually closed as though buried thousands of feet, are looked up millions of dollars in gold. These are slowly being reopened and worked by drift-mining, and promise in the coming century to produce many millions. The quartz mines are being developed and proving very profitable. In the valleys the cereals are grown extensively. The lower foothills produce the small fruits, cherries, apricots, peaches and the citrus fruits; the middle foothills, the grape, olive and fig, while in the higher elevations, the apple and the pear do best. The fruits are not confined to any one locality or altitude. The peach is a success from Roseville in the plains, to Auburn, while the Aloha, the largest northern citrus nursery in the State, is located at Auburn and with its 120,000 of most thrifty, acclimated orange trees shows how well the elevated portions of each fruit ranch can be made to produce exceptionally fine oranges.

Towns.

The stranger entering the county from Sacramento finds the beauty and thrift of the county growing as he advances. At Roseville the principal product is grain, though there are some fine fruit ranches on the hyroade. The town is similar to those of the plains and is not apt to impress the stranger favorably.

Rocklin shows more thrift and business; her large granite quarries employ a large force of men, while the fruit interests are shown in occasional citrus and fruit orchards.

Loomis is fast crowding ahead; the thick underbrush is fast being cleared away and innumerable orchards taking the place.

Penryn, though quiet, is home-like. Her granite interests are quiet, owing to the death of Mr. Griffith, the owner; but not so her fruit interests. Her shipments have gone on increasing, while Strong & Co. have put in a fruit-shipping house where carload after carload of fine fruit is shipped throughout the season. Mr. Butler's famous peach orchard is half-way between Penryn and Loomis, while there is acre after acre of all varieties of fruit in every direction.

Newcastle claims the distinction of being the fruit center, and from this point the greater portion of the county's fruit is shipped. It would be less difficult to state what will not grow, and is not grown, in this section than to give a correct list of all the fruits and vegetables grown.

Auburn is the county seat and business center of the county. While the fruit shipments do not equal Newcastle, the volume of business in other channels will exceed. Fruit, however, is not neglected. On every side can be seen row after row of trees standing like plumes against the hillsides. It is the town itself that impresses the stranger most favorably. The succession of fine homes with beautiful yards surrounding them, elegant hotels filled with seekers after health and pleasure and the general courtesy of the citizens toward the visitor make Auburn the most desirable place of residence in the county. Within the past two years the improvements have been most marked, as evidenced in the large number of fine homes and business buildings erected and in the course of erection. The fact is, the people are prospering and that as never before.

Applegate, Weimer and Colfax are but railroad stations, Colfax being the larger town and having a few stores. While the county claims the belt as a peach center, other fruits do equally well and none more so than the fig. In fig culture and curing, Placer has made a success.

Soils and Health.

In the matter of soils, the county is as varied as are the opinions of the citizens in regard to their merits. From Roseville up to Newcastle the soil may be said to be granitic. This soil produces fine fruit, but should be irrigated liberally to yield the greatest profit. From Auburn to Colfax the soil is slate and clay. With thorough cultivation, trees and vines can

be grown successfully without irrigation, though it is generally admitted that "it pays to irrigate."

As in soils, so in health; each location claims exemption from all malarial influences. By carefully selecting the site for the house, and placing it on the highest knoll, comparative exemption from malaria can be secured. Low situations in irrigated districts are to be avoided, not only in Placer but in all parts of the State. The people living on the slate soils claim exemption from malaria, and charge it to the granite soil. This matter can best be tested by a personal visit in midsummer's irrigating season. I believe that the low lands and gulches are not desirable, in point of health, but I am confident that owing to the variety of the topography, a home site, free from malaria, can be secured on every 160 acres of land.

E. H. SCHAEFFLE.

An Object-Lesson.

Storing Water at Small Cost.

The people at and about Honey Lake valley are fully awake to the utility of water storage. They have experienced the benefits of having a supply of water upon which to draw in the dry season through a few small pioneer reservoirs constructed a year or two ago, and the lesson was not lost. Last fall about a dozen reservoirs were commenced. A few were completed and work has been pushed on others nearly all winter. Some of the dams are of large size. All are earth embankments faced with stone or plank. The only regret of the people now is that they did not begin work on their dams earlier in the season, several large ones not yet being completed.

The Lassen Advocate, published at Susanville, says that all the reservoirs might have been filled ere this had the dams been properly supplied with waste sluices. These not having been provided, it has been necessary to watch some of the dams day and night.

An account of one reservoir and the situation at it will serve for all others that are not yet finished. The Bill's Canyon reservoir is being built by Susanville men at a point about 14 miles east of that town. Work on the dam was begun last September. The main dam is 250 feet long, with a wing extending out upon a low bench a distance of about 250 feet farther. The main fill will be 40 feet high, with 200 feet base. It will be paved with rock on the inside from bottom to top, and near the top will have a waste-weir of plank 30 feet wide and 5 feet deep. The water is to be drawn off for use through two iron pipes—one of 15 inches diameter on the bedrock and one of 22 inches diameter 11 feet higher. The dam will flood 110 acres to an average depth of 30 feet.

It was expected that the dam would be finished by Feb. 1, but the bad weather prevented. When the thaw came, the waste-weir had not yet been put in. To save the dam required the coat and work of 15 men day and night for 48 hours.

The Advocate of Feb. 6 says: "The waters rose to the very top, and were conducted through a cut on the east end, which was prevented from widening by the efforts of the men, who had to watch it every moment until the angry flood subsided. The two pipes—one 15 inches and the other 22 inches—were throwing out a stream of water 25 feet from their mouths, and the entire space within the dam away up the canyon was one sea of water."

This reservoir is built on no stream, but has above it a very large watershed. Several other reservoirs that have been built or are being built depend on similar watersheds. The Bill's Canyon reservoir will irrigate a large tract of land lying east of Honey Lake. The embankment of the dam is composed of sand and loam.

The cost is not stated, but for the benefit of our readers who may think of undertaking similar works, we will mention a dam or two, the cost of which is given.

The dam built for J. H. Williams has a length of 150 feet; base 60; width on top, 20 feet; height, 20 feet; covers 200 acres of land and irrigates two sections of land; built 1887, and cost \$600.

Another reservoir built in 1887 is 500 feet long, 9½ high, 8 feet wide on top, and has a base of 33 feet. It forms a lake of 500 acres and cost only \$600. No living water.

One more example which we shall give, condensed from the Advocate, should make scores of converts, as it shows that it does not cost very "big money" to build a first-class reservoir. The reservoir of the Lassen County Live-stock Co., completed and now full of water, is 225 feet long, 45 high, with a width of 125 feet at the base and 12 feet at the top. It is built of rock and earth, well packed, and is faced on the inside with 3-inch plank. It floods Round valley, a basin of 310 acres, to a depth of 40 feet, and it cost but \$2000. The company has a tract of several thousand acres of rich dark loam which will be irrigated. The dam is fed by no living stream, but has a great area of watershed. The company has irrigated several hundred acres of its land with the water that flows naturally down the canyon in the spring of the year.

OLD MINERS believe that this will be the greatest mining year ever experienced in Southern Oregon.

A TWO FOOT vein of solid galena is reported in the bottom of the Queen of the Hills mine, Idaho.

The Cassel Gold-Extracting Process.

Mr. H. A. Jones, general manager and secretary of the Cassel Gold Extracting Co., has arrived in Denver, Colo., to introduce the process there. He says:

"Our process, which has been in practical use but little over a year, is one which will reduce the most refractory ores and decrease the cost from the present cost of \$15 to \$20 per ton to \$5 per ton. In our works in Glasgow, where we have used ores from New Zealand and other parts of the world, the absolute cost of the chemicals required in extracting gold and silver from any kind of ores was \$1 per ton. This was the essential cost. The rest of the expense will be not to exceed \$5 per ton, and we make the reduction in one operation, taking the raw ores from the mines without roasting or concentration. No roasting is necessary, although concentration can be applied if necessary or thought practicable by mine-owners or ore-shippers."

The process of which Mr. Jones is the manager was invented and patented by John Stewart MacArthur of Pollockshields and Robert and William Forrest of Glasgow, Scotland, May 14, 1889. They have letters patent in South Africa, South Australia, Canada, New South Wales, New Zealand, France, Belgium, Brazil, Portugal, Italy, Spain and the United States.

The first plant was erected in Glasgow, and last July made a run of 22 tons of New Zealand ore. The result was such a success that another plant was erected there and one in South Africa. The fourth one is being built at the Crestone mines in Saguache county, Colo., under the supervision of Dr. M. Werner, who has been experimenting with the new process on Colorado ores, besides having sent 60 samples to Glasgow for treatment. The works in Saguache will have a capacity of 15 tons per day and will be in operation about March 1st.

"The process," said Mr. Jones, "will revolutionize the present system of reducing ores, and is no longer an experiment. When we can take raw ores from the mines, containing all the metals, and obtain the gold and silver by a single operation at a cost of not to exceed \$5 per ton, you can readily perceive the result."

There is no secret about the process. In fact, it is described in the letters patent. It depends upon the great chemical affinity of cyanogen for gold and silver, and the ease with which these metals form soluble double cyanides with the alkali metals. The process on a large scale is carried out, according to Mr. Wm. Jones in the December number of the *Engineering and Mining Journal*, as follows:

"The ore, without any previous roasting if sulphur should be present, ground to 40 mesh, are placed in pans or wooden vats provided with a stirrer, and to every ton of the ore there is added about 100 gallons of water containing one quarter, one-half or three-quarters of one per cent of cyanide of potassium or sodium or other percentage which experiment in the laboratory shows to be the best approximate strength to use. The whole is then stirred for four to eight hours, the length of time depending upon the nature of the ore. The liquor is then run off, carrying with it on an average 85 per cent of the gold contents of the ore and 80 per cent of the silver. It is filtered, and the gold and silver in it are precipitated by passing slowly through zinc turning, when complete precipitation of the gold and silver takes place. They attach themselves as a loose powder to the zinc, and are easily removed by shaking or stirring, the gold and silver precipitate on sludge falling to the bottom of the vessel, and is removed, dried and melted in the usual way."

THE KARA MINES.—Mr. Kennan describes the Kara mines, where the recent Russian atrocities occurred, as follows: The mines of Kara, which are the private property of his Imperial Majesty the Czar, and are worked for his benefit, consist of a series of open gold placers, situated at irregular intervals along a small rapid stream called the Kara river, which rises on the water-shed of the Yakhonoi mountain, runs in a southeasterly direction for a distance of 40 or 50 miles, and finally empties into the Shilka, between Stretinsk and the mouth of the Argun (Argoon). The name "Kara"—derived from a Tartar adjective meaning "black"—was originally used merely to designate this stream; but it is now applied more comprehensively to the whole chain of prisons, mines, and convict settlements that lie scattered through the Kara valley. These prisons, mines and convict settlements, taking them in general order from south to north, are known separately and distinctly as Uet Kara or Kara mouth, the Lower Prison, the Political Prison, the Lower Diggings, Middle Kara, Upper Kara, and the Upper or Amurski (Am-moor-skee) Prison. The administration of the whole penal establishment centers in the Lower Diggings, where the Governor of the common criminal prisons resides, and where there is a convict settlement of 200 or 300 inhabitants and a company or two of soldiers in barracks.

DIDN'T FIND OUT.—The Sierra Tribune is responsible for the following: A couple of the owners of the Battle Saddle mine went up there this week to see if everything was all right. They did not take a shovel with them to dig in the snow for the cabin because they had, before any snow fell, tied a shovel 30 feet higher than the cabin, to a pine tree, in order that they

might have it in case they had to go up to the mine during the winter. When they arrived at the spot Monday, they could only see a little of the pine tree. The snow had covered the cabin, shovel, and nearly all of the tree. It is believed to be about 60 feet deep. The boys, of course, came back to town without finding out whether their cabin was there under the snow or not, but they think that it will turn up all right in the spring, with the shovel hanging to the tree above.

New Coal Mines.

Few people are aware of the efforts which are being made to emancipate San Francisco from its dependence on British Columbia and Australia for its coal supply. Several years ago seams of coal were discovered in the northern part of what was then known as Washington Territory. One of these was in the extreme northern part of the Territory, close to the British Columbian line and on the westerly range of an extended coal-field. The coal was a lignite of fair quality. Another was on Oerhon river, some 30 miles northeast of Tacoma. This was a bituminous coal, hard and clean, but not as rich in carbon as the Eastern coal. Neither of these coals was equal in quality, either for heating purposes or for cooking or steam, to the Wellington coal, and the railroad has been obliged to rely on importations for the bulk of its supply.

A year or two since other extensive coal-beds were discovered, also in Northern Washington. An option was secured on them by C. P. Huntington, who was satisfied from samples which he received from trustworthy sources that the coal was as good as the Wellington. An arrangement was then made with Villard of the Northern Pacific to build a railroad from the new mines to the seahoard and to erect sheds at the landing capable of containing many thousand tons of coal. The mines and the road are to be the joint property of the Southern and Northern Pacific Companies, or of a company to be formed out of their stockholders, and to carry the coal to San Francisco. Three steam colliers of 3000 tons each have been built or are in course of construction.

If the reports of the mining experts are confirmed by the practical working of the mines, this discovery will break down the control of our coal market, which has been held by the Danemuir and the collieries in New South Wales. To compete with our own coal these foreigners will have to reduce prices, and instead of paying \$10.50 per ton for coal in this city, householders should be able to supply themselves at a trifle over half that figure. Not the least charm in the prospect is the impossibility, after the new mines are opened, of cornering the market in San Francisco under the pretense of a strike or a fire in the mines.

ELECTRICITY AND MINING.—One of the greatest fields that electric power has of late been called upon to enter is that of mining, remarks the *Electrical World*. The use of the electric light in mines is not new, and possibly its success has helped create the demand that has sprung up for power appliances. But that as it may, there can be no doubt as to the reality and extent of the demand, and vast as are the fields already opened up for the electric motor, it may be seriously questioned whether the opportunities in mining, the latest sphere of its occupation, do not surpass all others. We believe that 1890 is destined to be the connection year as the starting point of electric mining on a grand scale, as 1889 was for electric railroading. One cheering feature in connection with the new departure we have thus distinguished is the hearty welcome accorded the new power by mining journals, mining experts and the mining world in general. There has been at once an absence of prejudice and a keen appreciation of the advantages that electricity can give, and it now depends upon electrical inventors and electrical engineers to rise to the occasion and reap the rewards that await ready ingenuity and honest work. They may form some idea of the immensity of the field from the fact that the value of American mining products in 1888 exceeded \$590,000,000, and during the past year the industry has been no less prosperous. It is the province of electricity not only to aid in the economical and safe production of this great wealth, but to bring up to the point of remunerative productiveness hundreds of mines that are worthless under other conditions.

ORE AND BULLION YIELD.—Following is the official report of the ore and bullion yield of the Comstock mines named below, during the quarter ended Dec. 31, 1889: Justice produced 2846 tons of ore, yielding bullion valued at \$58,779.89; total cost of extraction and reduction, \$56,810.05; yield of ore in bullion, \$20.05 per ton; total yield above cost of production, \$1969.84. Bullion tax on net proceeds, \$98.49. Occidental Con. produced 3140 tons of ore, yielding bullion valued at \$47,760; total cost of ore extraction, \$18,600; cost of reduction and sale, \$29,470; yield of ore in bullion, \$15.25 per ton; cost of production above yield, \$400. Crown Point produced 5675 tons of ore, yielding bullion valued at \$69,381.94; total cost of extraction, transportation and reduction, \$74,394.55; average yield of ore in bullion, \$12.25 per ton; cost of production above yield, \$5012.51.

Irrigation on Public Lands.

Senator Stewart has prepared an Irrigation bill to be introduced at the first opportunity, upon which he invited the criticism of the Western press and people. The bill provides:

SECTION 1.—That the United States shall confer upon organizations, to be known as irrigation districts, certain specified powers, the first being those possessed by all corporations, to sue, be sued, have a seal, acquire the property necessary to establish a complete irrigation system for each district, to elect officers of each district by a popular vote, to construct reservoirs, canals and other hydraulic works necessary to a complete system of irrigation, to make laws for the equitable distribution of water within the districts, to levy and collect taxes upon all arable lands within the districts, public and private, and to raise money for the construction and maintenance of irrigating works.

SEC. 2.—Whenever the Governor of a State or Territory in which an irrigation district exists shall notify the Secretary of the Interior of the existence of such organization, and shall certify that the organization is in good faith, made with the consent of a majority of the people residing interested in such district, it shall be the duty of the Secretary to cause a survey to be made. Such district shall include in its boundaries all arable lands which can be irrigated by a general system of irrigation, which can be regulated by the same general rules. They shall also include in such district such pasture, timber lands, reservoir sites, lines of ditches and places for other hydraulic works as may properly belong to such district, and shall fix a time within which irrigation work shall be completed.

They shall then divide the district into the following areas: First, reservoir sites, ditch lines and other places for hydraulic works; second, lands susceptible of irrigation; third, pasture lands; fourth, timber lands.

The arable lands shall be subdivided without delay into 40, 80, 120 acre tracts, and shall be subject to entry under the homestead laws only. The arable lands of the United States in such district shall be subject to the same charges, taxes and assessments as are imposed upon private lands receiving like benefits.

All charges, assessments, and taxes levied by the irrigation organization upon arable lands of the district, together with the legal interest on such charges, shall be a lien upon all arable lands within the district to be irrigated, and persons who shall thereafter acquire title to any such arable public lands shall take the same, subject to the charges and interest. All lands in the district shall be withdrawn from entry and sale except mineral entries, also except as provided by this Act.

SEC. 3.—Whenever irrigation works necessary to furnish arable lands with water shall have been constructed in a substantial and durable manner, according to plans approved by the Secretary of the Interior within the time fixed by him, and there shall be an actual resident who is the owner on each legal subdivision of arable public lands in such district entered under the provisions of this Act, the Secretary shall issue a certificate that the irrigation of said district is complete and that the public lands therein contained are in bona fide possession of citizens of the United States or those who have declared their intention to become such, and that such citizens are residing on the lands.

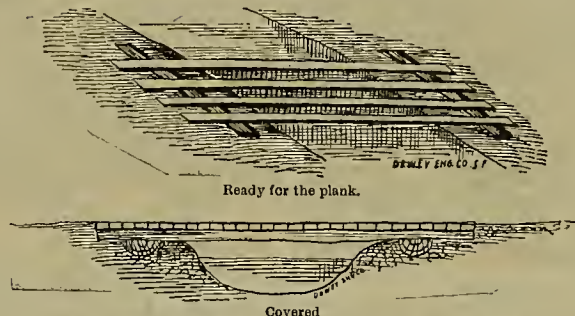
The timber pasture lands in such district shall thereupon become the property of the district, and the district organization may sell such timber pasture lands in such manner as Congress shall approve. Patents shall thereupon be issued for homestead entries made in pursuance with the provisions of this Act; also for all other bona fide entries of arable lands in the district which were made before the establishment of the district, provided that applicants for such lands shall have performed the acts required by the law under which the entries were made, but as to desert entries no further proof shall be required as to the desert character of the land or the fact of reclamation.

SEC. 4.—Whenever an irrigation district shall be situated in two or more States, it will be necessary for each State in which any portion of such district is situated to confer upon such district the powers and privileges hereinbefore set forth.

[There seems now a most wide and gratifying interest in the development of the waste regions of the great West. It is true that there is opposition on the part of some Eastern producers who think that further extension of the food-producing power of the West will be fatal to Eastern farming specialties. It seems to us that such opposition is not well taken. The Eastern farms, by reason of their proximity to almost limitless markets, have an advantage which can never be taken from them, providing the producers use their opportunities wisely. It is true that there may be needed some changes in their choice of crops and methods of farming, but it seems altogether unlikely that wise productive efforts expended in the vicinity of such vast millions of capable purchasers will ever be unprofitable. The East should also look upon the West as but the field for the enlistment of their surplus population.]

In giving the West a chance to grow and to offer opportunities for enterprise, the Eastern people of the present generation are only wisely preparing places for the prosperity and comfort of their own sons and daughters. The West now gratefully acknowledges paternity in the East, and the recognition of such relations will grow wider as the years advance. The enterprise which incites an individual farmer to reclaim and make productive the swamps and back lots of his own farm to provide for a growing family is only on a small scale the work which Uncle Sam should do with his vast waste regions to give homes and comfort to his multiplying millions. It seems to us that any narrow view or direful apprehension at the East of the influence of the growth and development of the West is unnecessary and ill-placed. We trust a full discussion of the subject will rescue the people of the East from the maintenance of such views.—EDS. PRESS.]

A RAILROAD ON TREE TOPS.—A well-known but curious fact is thus stated by the *St. Louis Republic*: It may not be known outside of the neighborhood in which it is situated, but it is nevertheless a fact that in Sonoma county, Cal., there exists an original and successful piece of modern engineering and building that is not to be found in the books. In the upper part of the county named, near the coast, may be seen an actual roadbed in the tree-tops. Between the Olipier Mills and Stuart's Point, where the road crosses a deep ravine, the trees are sawed off on a level with the surrounding hills and the timbers and ties laid on the stumps. In the center of the ravine mentioned two huge redwood trees, standing side by side, form a substantial support. These giants have been



SUGGESTIONS FOR ECONOMICAL BRIDGES.

lopped off 75 feet above the bed of the creek. This natural-tree bridge is considered one of the wonders of the Golden State, and for safety and security far exceeds a bridge framed in the most scientific manner.

WILL RESUME WORK SOON.—Capt. Richards, who returned Friday from the Centennial mine, had an interesting trip. At the mouth of the tunnel he found the snow ten feet deep on the level. The current of warm air ascending from the tunnel had kept open an incline as round as a barrel, three feet in diameter and ascending to the snow's surface at an angle of 45 degrees. Down through this the captain descended into the tunnel, where he found everything in good condition. The cabin and blacksmith shop at the mine have both been flattened by the snow. He will go up there in a few days with some men and recommence driving the tunnel ahead.—*Nevada Transcript*.

AT VICTOR.—A ten-stamp mill has been erected at Victor, Los Angeles county, on the line of the Santa Fe railroad. It is expected the mill will be completed and in full operation within the next 40 days for crushing the ores of the Side-winder mine, distant nine miles from Victor, in the Silver Mountain mining district. It is also reported that an English company is to put up a mill about 25 miles from Victor, in the Holcomb mining district, to work the ores of the Black Hawk mines. Machinery will also soon be built on the Morongo mining property, 28 miles from Victor, in the Morongo district.

GUARDING AGAINST POSSIBLE DANGER.—For guarding against the perils of broken electric wires, when their ends fall on neighboring wires or metallic roofs, either of which may become mischievous conductors of the fluid, the *Electrical World* notices a simple apparatus, invented by Mr. E. P. Clark of New York, by which, "on the instant of a break occurring in the circuit, the dynamo ceases to generate current and remains inoperative until the break is repaired." If this device is all that is claimed for it, it will go far toward removing "the deadly wire" from the newspaper reporter's vocabulary.

A GENERAL STRIKE is threatened throughout the State of Alabama involving thousands of coal miners and causing 15 or 20 blast furnaces to close down.

THE Young America Gold Mining Co., Sierra county, cleaned up \$16,000 for the month of January.

Economical Bridges.

(Written for the Press by SECCA.)

I live in the Coast Range and have many years' experience battling with the streams which often overflow and sweep fences and bridges away. Not one man of a thousand can afford to hire a pile-driver, nor if convenient to make abutments of stone would it be practicable when the floods are out. For the light traffic of farm-work and hauling on county roads, much the best way to replace the span of a bridge, up to 20 feet, is to lay a mud-sill a few feet from the bank, bedded well, and place the sills on it for the floor. If the water is likely to overflow the bridge, then bolt the floor-sills down and spike the plank. This makes a bridge, my word for it, that will stand "from the first of June till the falls of the Ohio," if well located. One of the cuts shows the ground plan ready for planking; the other figure is a side view of stream and bridge completed, and no further description is needed.

It will cost Sonoma county a quarter of a million, out of the treasury, with private labor to make good the damaged roads and bridges. There will be running and fetching, and taxing and spending, all over California for the next six months to put the highways in shape. A great part of this under-intelligent management can be saved. Somebody will ask how? For answer, let me inquire of the reader if he ever noticed the water at work undermining a stone abutment? The first job the element undertakes is to get behind it, to bore the bank and gnaw at the revetment of timbers that sometimes are placed for protection. When it comes with the speed of wild horses in flight, from 5 to 50 feet deep, the power is irresistible. It is apt to "get there" every time; piles, masonry and cast-iron piers notwithstanding. Once let the band of man put a structure in reach, and it seems to set to work

A Test of Steel Ties.

Some time ago some of the railroad companies in the East determined to test steel ties as a substitute for wooden ones. John W. Clarke, roadmaster of the Chicago & Western Indiana Railroad Company and the Belt Railway Co. of Chicago, in the latter part of January made the following report in relation to the ties of steel that were laid on a part of the system over which he has control:

I beg to say that steel ties were laid on the 1st of October, 1889; and, as you are aware, they were put in at the above location on the south-bound track for the reason that at this point the ballast is very light gravel, which would make the test much more severe than if they had been put in at another location of the road. The traffic on this section is eighty regular trains in one direction every 24 hours, the heaviest engine being 96,000 pounds, with 15,000 pounds on each pair of drivers. So far the ties have given perfect satisfaction, requiring but slight attention, and that only when first laid. There are no loose bolts, clips or nuts, and so far have been none. It would be impossible for me to estimate correctly at the present time the saving in maintenance, as the ties have not been in service long enough. I believe, however, that there will be a great saving in maintenance, as the only thing to need attention is the bolts and clips, and so far they have shown no indication of weakness in any particular. There has been no upheaval of the ties where the ground is frozen, and from present indications I hardly believe that such will occur. The ties are in good line and surface, and hold the rails in an upright rigid position, so that the wear on the rail-head seems to be more uniform and even than where wood ties are used. I am free to say that the ties have so far surpassed all my expectations. There seems to be no possibility of spreading of the rails. Should a rail break, there would be less liability to accident, for the reason that the fastenings hold the rails absolutely firm and rigid. I believe that the saving in maintenance that will eventually be shown, and the absolutely safe permanent way which these ties make, to say nothing of their greater life, will show greatly in their favor.

CALIFORNIA HISTORICAL SOCIETY.—At a meeting of the California Historical Society, held Saturday afternoon, the following named were elected as officers for the ensuing year: J. R. Jarboe, president; George Davidson, William Norris and A. Varsi, vice-presidents; James A. Donahoe, treasurer; A. S. Hubbard, secretary; Committee on Publication—John T. Doyle, William Cary Jones and William Norris. These three last-named gentlemen will, with Horace Davis, J. V. Coffee, E. R. Taylor, R. C. Harrison and Bernard Moses, also constitute the Board of Directors.

A LEONARD DAY'S LABOR.—T. H. Cox, who worked for the Central Street Railway Company of Sacramento for 90 days as a driver and conductor, has sued the company to recover \$45 alleged to be due him for overtime. He worked 14 hours a day, and bases his action upon an Act of the Legislature, adopted March 11, 1887, providing that 12 hours a day shall constitute a statutory limit. This will be the first test of the law, and if Cox succeeds in winning his suit it will in all likelihood involve a majority of railroad companies in the State.

TO MEND RUBBER BOOTS.—The following is said to be a good way to repair rubber boots: Dissolve small pieces of rubber, not vulcanized, in warm spirits of turpentine to the consistency of thin molasses. Rub the patch and boot thoroughly with sharp sandpaper. Smear both with liquid rubber five times, letting them dry each time. At the sixth application, apply the patch with strong pressure to the boot and it is mended.

SOUTH AFRICA.—"A stampede is being made to Witwatersrand, South Africa, rivaling, it is said, the old days of '49, when the gold fever raged in California. During the past year no fewer than 1500 stamps have been laid down at Witwatersrand, thus bringing the total number up to 2000." The above statement was made by "promoters" for the sale of mining property in that district. The total number of stamps there does not exceed 750.

A CREMATORY.—The Board of Directors of the San Francisco Cremation Company will soon commence the erection of a crematory on their lot, situated on the northeast corner of California street and Laurel avenue. They have issued a circular to the public announcing their determination to commence business in the near future, setting forth their aim and object, and soliciting aid to carry out their undertaking.

THE property of the Baltimore M. Co. on American Flat has been attached by the Sheriff as security for payment of \$3028 due on a promissory note drawn in favor of Jacob Birtz of San Francisco.

THE Red Cloud group of mines, Wood River, Idaho, was sold for \$250,000, last week, to Standard Oil Co. men.

THE supply of skilled miners at Butte, Montana, is reported as being in excess of the demand.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

AMADOR GOLD MINE.—*Ledger*, Feb. 23: The afternoon shift on repairing to the mine last Saturday, on learning that they could not get their pay that day as they had been led to expect, refused to go to work, and returned to their homes. The other shifts followed suit. No work has been done around the mine since, except keeping the water out. Work on the car-track to the mill has also come to a standstill. Some 80 hands are thus brought to temporary idleness. This hitch is generally attributed to some misunderstanding among the stockholders. Since the above was written, the difficulties among the stockholders have been settled. The men were promised one month's wages to-day, Saturday; those who wanted to quit to be paid in full. It is also understood that a change of superintendent will take place the first of next month. John I. Minear will retire, and a gentleman now in Oklahoma, whose name we have not been able to get, will succeed him. The miners will go to work again in a few days, by the first of the month at the farthest. Mr. Sutherland, a mining expert who was sent out to report upon the property, made a thorough examination of the underground works last week, and was highly pleased with everything. In fact, the mine far exceeded his expectations, and his opinion is that there is a great future before it. He left with the other parties for San Francisco on Tuesday morning.

KEYSTONE.—Although but little is said about the improved prospects of the Keystone, the idea being to keep the matter as quiet as possible, there is no doubt about the fact of a valuable strike being made on the 1,400-foot level of this mine. The new ore body is said to be from 14 to 16 feet wide, a large portion of it being of excellent grade. The strike has been made at the south end of the claim, toward the boundary line of the South Spring Hill mine. They are still crosscutting west in the belief that still another ledge exists in that direction. Report says that the mill is to be started to its full capacity next month. The flow of water in the mine has moderated since the heavy storms of last month, and is now within easy control.

NEW LONDON.—The new mill had been running but a few hours when an examination of the plates revealed the gratifying fact that the rock was yielding handsomely. Everything points to this property at once taking its place among the steady gold producers of the county. It will do a good deal to relieve the dullness of Plymouth, incident to the shutting down of the town's mainstay of support—the Plymouth Consolidated mines.

MCKENZIE.—The prospects of this property have vastly improved. After a run of two weeks the cleanup this week yielded more than the output of any two months since the mine has been started. The ore now in sight is very rich. Some samples show free gold in considerable quantity. The mill was brought to a standstill early in the week, owing to the ditch having been choked up with snow. It will be started again as soon as the weather moderates.

Calaveras.

RICH GRAVEL.—*Prospect*, Feb. 22: It is reported that there is eight feet of gravel in the Union Shaft mine, and free gold can be seen all through it.

Inyo.

ARGUS RANGE MINES.—*Independent*, Feb. 21: Frank Bennett, an old-time prospector, has located 53 mining claims in the Argus Range in the neighborhood of the Haggin mine and the Riley mill. Last Sunday he went into Mojave with a wagon-load of samples of ore from 15 of the claims. The ore was sent to San Francisco to be worked for a test. Recently several parties from Los Angeles went to the district with Bennett and examined the claims. He bonded several of the mines to these parties. He says these men will put up a mill at a point convenient to the mines and will give miners a privilege to work any of the claims for a term of two or three years, and the miners have the entire proceeds for developing the mines. Bennett says men who will work can make good wages from the start. The business men of Los Angeles appear very willing and anxious to help develop the mining resources of Inyo county.

BORAX.—There are five teams engaged in hauling borax from the works in Sline valley to the railroad; two belonging to Schober and one each to Marshall, Hall and Smith. They have been hung up during the past week because of snow.

Placer.

ECLIPSE.—*Placer Herald*, Feb. 22: The Eclipse mill will be running next week. The battery and the ore-bin are in place and all that remains to be done is to put in the grizzlies. A large quantity of ore has been taken out. This ore prospects very well.

SUNNY SOUTH.—*Placer Argus*, Feb. 22: H. T. Power came down from Sunny South, Monday, to look after the Burnham estate, of which he was appointed executor. He says they have been working only about half the usual force for some time, in the Hidden Treasure mine, but will put on the full force as soon as the weather clears up, and he hopes for good returns.

MAYFLOWER.—F. Chappell's resignation of his position as superintendent of the Mayflower mine has finally been accepted. Mr. Chappell's health is not the best, and he will have a needed respite. Mr. Beach, who has acted as assistant, will take Mr. Chappell's place for the present.

Shasta.

RICH ROCK.—*Redding Free Press*, Feb. 22: This week a rich strike is reported in the Hart & Day mine, at Old Diggings, at a depth of 500 feet. The rock is said to be very rich, and this depth indicates that the mine is a valuable one. A good deal of work has been done on this mine, but until lately it has been of a superficial character.

San Diego.

THE COLORADO PLACERS.—*Yuma Times*, Feb. 20: From Mr. Thomas E. Fraser of the Colorado River Placer Co., we learn that the reported permanent suspension of work at the Pot-holes is false in every particular. The cessation of work will not ex-

ceed ten days at the longest. The present manager, Mr. Jackson, has disposed of the major portion of his interest to California parties who will energetically prosecute developments. A stockholders' meeting will take place on Friday next, when plans for more extensive operations than have been accomplished heretofore will be discussed and adopted. A bright future is in store for the company.

Siskiyou.

SALMON RIVER.—*Cor. Yreka Journal*, Feb. 15: Six miles above the town of Sawyer's Bar, the Harris brothers have been industriously engaged in hydraulic mining for a number of years. They were not possessed of means to purchase improved machinery or dig long ditches to bring a big supply of water to their ground. Last fall an agent for the Tioga company of San Francisco came and viewed and prospected the gravel, and made them an offer to bond the claim for one year, for \$30,000. This proposal they accepted. The company intend to commence work in the spring, by digging a ditch four miles in length, and shipping giants and everything necessary to work the claim in a rapid manner. The agent gave it as his opinion that the gravel would yield \$10,000 to the acre. The Gold Hill hydraulic mine, owned by Wm. E. Kline, is one of the best paying properties on Salmon river. It is close to town on the opposite side of the river, and has been worked in a limited manner for 8 or 10 years. The former owners for some reason were unable to make it pay. The supply of water to work this claim is obtained from Jessup's gulch. Kline became the owner, and went to work with a vim. Last season was a very dry one, and he had water only two months, yet he took out over \$1200. He has built two large reservoirs in which to store the water, run a low bedrock cut to open his ground from the lower end, and has everything in good shape for the coming season. Three miles down the river, on Steamboat flat, is a hydraulic mine owned by the Hickey brothers. Their claim is rigged with all the modern improvements, and when worked pays well. They obtain water from Shelatue's gulch, which affords a head for 3 or 4 months, on an average. Last fall they rigged up a river claim, opened a cut and performed considerable work, but did not reach bedrock before the storms set in, so they postponed work until next summer. The richest and most extensive hydraulic mines of the North Fork of Salmon river are situated five miles below Sawyer's Bar, and owned by Abraham Ahlgren, a Russian citizen of the United States. One of the claims is known as the Red Hill and the amount of dust it has produced would load a pack mule. It still pays well, but will be long worked out. Below the Red Hill is his lower claim, and at the present, and for some years past, the most remunerative in this section. From \$600 to \$1000 per week has been cleaned up for a week's run. He employs from 8 to 10 men when both claims are in operation. He has the best water right on Salmon river, which affords water for 10 months in a year on an average, and is taken from the Little North Fork.

Tuolumne.

SAN GIUSEPPE MINE.—*Sonora Democrat*, Feb. 22: This mine, located within the limits of the town of Sonora, has been sold to San Francisco parties, represented by W. G. Whorl, who is now here and who will have charge of the mine. The mine is regarded by those who have followed its development as a valuable property, and the results of all the ore worked in the mill prove this opinion to be well founded. It is a peculiar mine in some respects, for it is essentially a sulphuretted mine, containing very little free gold. The bullion is of unusually high fineness, reaching \$20.48 per ounce, \$20.67 being chemically pure gold, and those who know whereof they speak say there are only two other known mines that produce bullion of such great fineness. The sulphurets are of extremely high grade, having average value of \$580 per ton. The mine will be vigorously worked by the new ownership.

NEVADA.

Washoe District.

SIERRA NEVADA.—*Virginia Chronicle*, Feb. 23: On the 630 level are cutting out a shaft station.

UNION CON.—On the 1465 level from the north lateral drift, opposite west crosscut No. 4, an east crosscut is advanced 46 feet in porphyry.

MEXICAN.—On the 1465 level, west crosscut No. 3, 100 feet south of No. 2, the north drift from west crosscut No. 1, from the main north lateral drift, is extended 84 feet, continuing in a porphyry formation.

OPHIR.—On the 1300 level from the end of the east crosscut No. 5 in the shaft station, a south drift is advanced 395 feet, from the end of the east crosscut, 316 feet from the shaft station, continuing in porphyry and quartz.

CON. CAL. & VA.—The 1300, 1435, 1500 and 1600 levels continue to yield the usual quantity of ore. Shipped to the Morgan mill 1075 tons and 390 pounds of ore, and to the Eureka 1672 tons and 1970 pounds; battery sample assays showing an average value of \$27.46 per ton. Bullion valued at \$77,025.86 shipped to the Carson mill.

GOULD & CURRY.—On the 200 level from the southwest drift, at a point 335 feet from west crosscut No. 1, west crosscut No. 2 is advanced 30 feet. Formation, porphyry and quartz showing some value.

BEST & BELCHER.—On the 1000 level east crosscut No. 1 is extended 175 feet. Formation, porphyry and clay.

NORTH GOULD & CURRY AND EAST BEST & BELCHER.—Drifting west from both shafts in a favorable formation.

SAVAGE.—Shipped 340 tons of ore showing an average value of \$22.05 by battery sample assays. The falling off in ore shipments was due to a snow blockade of ore side-tracks. Raise No. 1 above the 400 level continues in fair-grade ore.

HALE & NORCROSS.—Shipped during the week 200 tons of ore, showing a value of \$20.75 per ton by pulp assays. Ore shipments were suspended during past five days on account of snow on the ore side-track leading to the Nevada mill.

CHOLLAR.—During the past week crushed 400 tons of ore, pulp assays showing an average value of \$20.87 per ton.

POTOST.—The 930 level east crosscut continues in quartz and porphyry.

ANODES.—Finished cleaning middle compartment of main shaft. Now sinking sump preparatory to drifting on 420 level.

IMPERIAL.—The 300 level west crosscut, No. 2, is still in porphyry. The 500 level west crosscut continues in quartz. The 500 level north drift is out 1390 feet from the Yellow Jacket shaft. But little progress was made in explorations the past week on account of break in Yellow Jacket air compressor.

ALPHA.—The 600 north drift is in quartz. The 500 level west crosscut has entered a favorable vein formation.

EXCHEQUER.—The 500 level line east crosscut is in quartz showing value.

OVERMAN.—Ore shipments, suspended during the week on account of blockade of ore side-tracks, will be resumed next week.

CALEONIA.—West crosscut No. 3 has entered low-grade ore.

YELLOW JACKET.—Ore shipments and underground work suspended two days during the week on account of break in air compressor. Explorations and shipments resumed to day.

CROWN POINT.—Shipped during the week 150 tons of ore showing an average value of \$18.50 per ton by pulp assays. Falling off below usual average was due to snow blockade.

BELCHER.—The 850 level east crosscut is in low-grade quartz and porphyry. The 200 level south drift is in porphyry. The 600 south drift is showing some quartz and clay.

SEG. BELCHER.—The 1200 north drift from the mine is stripping ore of fair grade.

JUSTICE.—During the week crushed 215 tons of ore of the usual average assay value.

ALTA.—Crushed 310 tons of ore during the week, battery samples showing an average assay value of \$24.75 per ton.

UTAH.—On the 600 level the southeast drift from the shaft station is extended 937 feet. Formation, soft porphyry, clay and quartz.

OCCIDENTAL CON.—Continue to extract ore of good quality from the stopes on the 400 and 450 levels. The raise 100 feet south of No. 3 raise is up 25 feet and continues in fair quality ore. The 550 line east crosscut is advanced 10 feet in porphyry and clay. A south drift from the end of the line west crosscut is extended seven feet in porphyry and quartz showing value.

NORTH OCCIDENTAL.—The 550 level joint east crosscut is extended to feet in porphyry and clay. The north drift from the line west crosscut is extended nine feet in porphyry and quartz showing value.

Aurum District.

BULLION PROCUING.—White Pine News, Feb. 15: The Davis & Sanford property has been a bullion-producing and paying property for several years. The owners—Simon Davis and Ben Sanford—have been shipping their rich ore to Salt Lake and storing their lower grade at the mine. If the property, which has shown itself to be valuable, is not sold, the owners will put up a mill themselves.

Cherry Creek District.

BRIGHTER PROSPECTS.—White Pine News, Feb. 15: Cherry Creek, which in the past seven years, through the malpractice of her mining doctors, has received more black eyes and foul "under the belt" blows than a fighter in a prize-ring, is manfully battling the odds against her, and though recently sent to "grass" by a legal knockout, her people write us she will come to the "scratch" again in the spring and renew the struggle with brighter prospects of success. Cherry has by far the best defined mineral ledges of any camp in the county.

Eureka District.

FURNACES.—Eureka Sentinel, Feb. 15: Eureka con. furnace No. 1 is being fitted up. Both furnaces will be ready for use by the time that the company will be ready to resume smelting, which, probably, will not be before the 1st of April.

Granite District.

GOLD.—White Pine News, Feb. 15: A report reaches us from down the valley that a rich strike of gold ore has been made in the south end of Granite. Wm. Dodd, J. L. Miles, Geo. P. Holmes and W. D. Campbell are said to be the lucky owners.

Oscola District.

PLACERS.—White Pine News, Feb. 15: As soon as spring opens the Oscola Gravel M. Co., with a full head of water, will tear up the ground at a lively rate and produce the coming season a rich golden harvest. Its operations will materially aid every industry in the eastern portion of the county.

Patterson District.

RUBIES.—*Pioche Record*, Feb. 23: But little prospecting has been done in the northern part of Lincoln county, yet there is no doubt that the mineral resources of this section are both varied and extensive; ores of gold, silver, lead, copper and cobalt have been found, and the thorough prospecting that will follow the coming mining revival will bring this part of the county into prominence as an ore-producer. A curiosity in its way and showing the lavish hand with which Nature has bestowed her treasures on this region is a veritable mountain of rubies. The formation, which is much worn and seamed by melting snows, is a bluish-gray porphyry thickly studded with fragments of jet and small rubies. The gulches radiating from and around this mountain hold millions of these beautiful little jewels too small probably to be of commercial value, but of first quality. Further prospecting may develop them of larger size, as only a passing examination has been made.

Robinson District.

PROSPECTING.—White Pine News, Feb. 15: The impetus given to prospecting in this district by the discovery last fall of the now famous Joanna Bonanza is already proving beyond a doubt that great mineral wealth lies hidden in the vast mineral zone of Robinson District, waiting only for capital and enterprise to yield up the treasure. From several prospecting mines outside of the Joanna, come very flattering reports of rich strikes, on which the hardy prospectors are pushing ahead, and, in all probability, before mid-summer some of these are likely to develop into just as valuable properties as the Joanna. The great extent and varied mineral deposits of this district, which have so long lain latent, have aroused so confident a feeling of intrinsic worth both at home and abroad that the operations of the present year are certain to show up and bring to the front two or three—may be half-a-dozen—twin sisters of the mine whose fame has brought the district into prominence. The gold is here, and the men

who are delving for it will find it, and when found capital will seek investment if the mine-owners meet them on a fair business plane. It cannot be denied that the present need of the district is a company with capital to build reduction works and push the work of mining development on a larger scale than can be done with the limited means at the command of the present owners. One good company operating in the district would in one year do more to develop its resources than can be done in half a century under the present methods.

Taylor District.

PROSPECTING.—White Pine News, Feb. 15: While the Eberhardt-Monitor Company has been forced to suspend milling operations for the winter, quite a force has been kept in the mines taking out ore and prospecting, and in the latter, we learn, they are meeting with good success. As they will have plenty of water the coming season to keep the mill running to its full capacity, the season will be a prosperous one with them.

Tuscarora District.

NAVAJO.—*Times-Review*, Feb. 21: Upraise from south drift, 150-foot level, extended 11 feet; vein continues strong. No. 2 west crosscut, 350-foot level, extended 21 feet, cutting seams of spar.

YOUNG AMERICA SOUTH.—Timbering was the only work done during the past week. The mine is filling rapidly from the melting snow. No more work will be done in the mine until machinery has been erected.

BELLE ISLE.—Crosscut from north drift, 250-foot level, near the Navajo line, extended 22 feet; ground seamed with spar and some iron. The crosscut from the north gangway, 350-foot level, extended 18 feet with quite a flow of water near the face.

NEVADA QUEEN.—The north gangway from 600-foot level station has been advanced 21 feet, cutting the vein. A large flow of water is coming in through the face. Face shows high-grade ore.

GRANO PRIZE.—400-foot level: North crosscut extended 12 feet. 500-foot level: East drift from north crosscut extended 18 feet, face showing 2 feet of concentrating ore. A north crosscut has been started from the west north lateral drift. A crosscut has also been started north from the east drift on the front vein.

NORTH COMMONWEALTH.—1st level: North drift from No. 1 east crosscut has been advanced 10 feet. Have cut into the ore from No. 1 upraise 60 feet from the raise, assays from \$70 to \$287 per ton. Drift running south from near the Del Monte line is exposing fine ore full size of drift, average \$309 per ton.

DEL MONTE.—1st level: North drift from joint crosscut has been extended 5 feet; face shows all high grade. This is the same ore body as North Commonwealth drift. Average, \$250 per ton. North drift from No. 2 crosscut advanced 8 feet. The ore is improving as it is drifted on; average of first-class, \$420 per ton, 3d level: North drift from joint crosscut has been extended 13 feet; face is in low-grade ore.

NORTH BELLE ISLE.—South intermediate drift from No. 3 chute, 300-foot level, extended 6 feet; face still in good ore. North gangway from shaft, 600-foot level, extended 21 feet, cutting into ledge some 20 feet, and showing a large amount of quartz and spar, from which assays may be obtained as high as \$450. Water increasing.

COMMONWEALTH.—1st level: East drift from No. 1 north drift has been extended 11 feet; total, 72 feet. The ore body continues to develop well. The Dolan drift advanced 14 feet in concentrating ore. North gangway has advanced 20 feet in vein porphyry. North drift from south gangway advanced 6 feet, cutting some high-grade ore, improving in quantity as we drift on it. The mine is looking well throughout. Hoisted during the week 813 cars of ore, all of which has been sent to the mill and concentrator. Average battery of 151 tons crushed, \$266 per ton; average of 500 tons worked at concentrating plant, \$21 per ton. Bullion shipped, \$16,042.25. Crude bullion on hand, \$17,000.

Ward District.

MARTIN WHITE.—White Pine News, Feb. 15: The Martin White Co. have a few men prospecting their mines. If they find anything good, the force will be increased in the spring.

Whites Pine District.

ONTARIO.—White Pine News, Feb. 15: In the Ontario mine, one of the Watson series in this district, which is under lease to Mr. Norton, a rich strike has been made. Ore that goes between \$60 and \$70 in gold and carries some silver is now being taken out. Mr. Norton has put three or four men to work. As soon as the roads get in good condition, considerable ore, which has accumulated here during the winter, will be shipped by our prospectors to Salt Lake and other points for reduction.

AROUND HAMILTON.—White Pine News, Feb. 15: No corporate work is now going on, nor do we hear of any likely to resume operations there the coming season, but the old stand-by prospectors of the district, who have never faltered in their faith in the camp, are doing a good deal of chloriding and shipping rich ore for reduction. These are the men who are keeping the embers of hope burning in the old camp still.

ARIZONA.

A STRIKE IN THE OLIVE.—*Virginia Chronicle*, Feb. 23: Washington camp, in Arizona, 18 miles south of Cripple Creek and five miles north of the Sonora line, in the Patagonia mountains, is now a scene of some excitement, owing to a rich strike of ore in the Olive mine, near the old Mowry smelter. When the Mowry works were closed down in 1863, an old Mexican miner reported that ore was left in one of the shafts that would run 1500 or 2000 ounces in silver. On the strength of this report numbers of different parties have sought in vain to strike it, but have successively failed. Within the last two years one party spent over \$2000 in search of the rich ore referred to by the old Mexican miner. It is believed the vein has at last been found in this new strike. The ore runs from 300 to 2000 ounces in lead and silver, native silver abounding in large quantities. Some of the samples are so strung together with wires of native silver that it is impossible to break them. The vein is reported to be from 2 to 8 inches wide. The parties who made the strike are Nicholas Carr and Frank Olsen.

CUPEL.—*Mobave Miner*, Feb. 22: The Cupel mine, Stockton, is producing the usual quantity of good ore. The last ore body has produced over

2000 sacks to date, with a considerable stoep to bear from.

LEAD ORE.—M. P. Delhanty sent in the first half of a 20-ton lot of lead ore from the Schuykill mine, Chloride, on Thursday. It was unloaded at the Kingman Sampling Co.'s works.

HEAVY LOAD.—The heaviest load of ore hauled from Chloride by 12 mules and 2 wagons without "dropping," came in on Thursday, 19,882 pounds. Del Bebe says he "pulled" the long hill with ease, and with three wagons he can haul a carload.

PURCHASE.—It is stated on reliable authority that the O. K. Mining Co. have purchased the Monarch Mining Co.'s mill at Gold Basin, and will move it to the O. K. mine, where they have succeeded in finding an abundance of water.

C. O. D.—E. F. Thompson and W. A. Watkins have leased the C. O. D. dump. This dump is quite vast and contains much good ore, and the problem of how to cheapest assort and save it will soon be solved by Messrs. Thompson & Watkins, who immediately put a force to work.

GALENA.—Messrs. Lynch & Larkin, proprietors of the Arizona Sampling Works, have a force of men at work on the Little Man mine, a property they recently purchased from John Crawford and John Mulligan. There is plenty of galena in sight and Messrs. Lynch & Larkin expect to extract a good many tons of ore per month after this (February), which will be consumed in putting things in shape for active operations.

A MILL.—W. B. Campbell came in from his mine near Cerbat, on Wednesday, and reports the ore as growing richer and the vein wider as development goes on. No more ore will be worked by assatta for the present, but Mr. Campbell intends to soon make a shipment or lease a mill and work it himself, as the gold is very free and easily amalgamated. The vein is seven feet wide and shows free gold the entire width, while there are five streaks from one to three inches wide which are very rich. No drifting has as yet been done and the extent of the ore body is unknown.

MUSIC MOUNTAIN.—W. F. Grounds showed us the returns of a batch of ore from Music Mountain which worked over \$1000 gold per ton at the Kingman Sampling Co. Mr. Grounds has a carload, which is now being sampled at the above works, but, of course, will not prove so high grade as the first-class. Mr. Grounds thinks it will be but a few months, at least, before there will be a mill there for the reduction of ore, as the development work has proven there are large quantities of \$50 to \$60 free gold ore, which must be milled in that district, as shipping charges consume the miners' profit. There are at present some 15 men working and all doing well, in fact the camp never before had one-half the flattering prospects that now present themselves.

AT QUIJOTOA.—*Suppl's Report*, Feb. 22: During the week good progress has been made in shaft No. 1 of the Peer, making total depth 53 feet, with the ore continuing very strong for more than width of bottom and of good grade. In the south drift from 100-foot level the ore continues strong and of good quality. Fair progress has been made during the week, making total length of drift 42 feet.

PEERLESS.—On the 450-foot level an east crosscut was commenced and extended 19 feet during the week, showing some strata of quartz, when work was suspended and again resumed in the north drift, which was advanced to feet, making 445 feet, without any change of importance.

CROCKER.—On the 370-foot level good progress has been made in winze No. 2, making its total depth 61 feet, with the bottom in ore of some value for width; will soon commence drifting north and south.

WELDON.—In shaft No. 1, below the 100-foot level, fair progress has been made in sinking, the formation being very hard, the vein continuing regular and showing some ore. At a depth of about 40 feet below the 100-foot level the junction with the west vein ought to be reached.

COLORADO.

IMPROVING.—*Silverton Standard*, Feb. 23: The Alethea is steadily improving. Wm. Corlett, the lessee, shipped a car of high-grade ore this week and has another all ready to get down. The mineral is taken down to the road in raw hides. Ben Harwood has a contract to take provisions up to the Lookout mine and bring down a carload of ore. The ore-house is full of mineral. The contractors on the crosscut on the Mineral Key, in Whitehead gulch, owned by Geo. Giton, have just encountered a large body of water, and expect to cut the main ore streak this week. The Little Dora, owned by the Victoria M. & Co., is looking better than ever, and a nice grade of gray copper is now being taken out. A carload was shipped yesterday to Pueblo. Wiley & Harper will commence work upon the Pearl mine about the middle of next month. The drift upon the vein, from the end of the crosscut, on the Iowa, is now in 60 feet. The gold streak still holds about the same, averaging 18 inches wide. Last week a new streak of solid steel galena was uncovered, which looks very well. This property is being worked under lease by James H. Robin and B. W. Thayer. The toboggan slide on the North Star is working to perfection and the boys are getting down about 12 tons a day. The ore is being taken about 600 feet down the bluff and being dumped on the flat above the mill. By moving this ore plenty of room will be made in the ore-houses, and the mineral moved will be in a position where the packers can remove it with one-third the trouble in the spring. Wm. Feigel, the contractor on the new mill being erected by the John H. Reid M. & Co., went to Durango Monday to get 1000 feet of lumber to complete the building and an engine stone. As soon as these arrive the mill can be completed in about two weeks.

IDAHO.

THE CRESSUS MINE.—*Wood River Times*, Feb. 19: The strike reported in the Cressus mine, a few days ago, promises to prove so important that our miners are even beginning to speak of the property as likely to prove "a second Granite mountain." The original strike was of two feet of ore on the "near" wall of the vein. Since then the workings have been pushed 25 feet, and without finding any indication of the opposite wall. These 25 feet are wholly composed of 14-gauge matter carrying streaks and veins of ore that are quite rich. The bulk of the new find is probably \$20 to \$30 ore, and therefore comes near the usual value of Cressus ore.

The Cressus mine, as is well known, is situated in Croy gulch, opposite the Hot Springs, and only about two miles from Hailey.

INCORPORATION.—*Idaho Avalanche*, Feb. 22: Supt. E. H. Dewey informs us that the Black Jack and Empire State mines have been incorporated under the laws of the State of Kentucky, the corporation's name being the Idaho & Pittsburg M. & M. Co. The houses at the mouth of the tunnel are now completed, and occupied by men working in the tunnel. The tunnel is now being driven ahead rapidly with three eight-hour shifts of men. The ground is yet soft, and good headway is being made. As soon as hard ground is reached an air compressor will be used in working Burleigh drills. The ground of the Black Jack and Empire State mines will soon be patented.

LOWER CALIFORNIA.

ALAMO DISTRICT.—*Lower Californian*, Feb. 21: Superintendent Ayers, of the International Company's mines, arrived from Alamo last Monday with \$6000 in gold bullion, which was the result of two weeks' milling on ore from the Princessa, Ulises, Telemaco and Indian. Mr. Ayers will leave by tomorrow's boat for San Diego to deposit the bullion. Since the beginning of 1890 the Co.'s mill has turned out \$7500 in gold, and it speaks well for Mr. Ayers, the superintendent, who is the first man to make a success of the Co.'s mill. He reports the camp to be in better condition than at any time since its discovery, and he is confident that many of its mines will prove to be veritable bonanzas. He is of the opinion that by the addition of concentrators the mill would be in splendid shape. On the Grande and Grandota line the International Co. is sinking, and also drifting in the tunnel between the Telemaco and Penelope, where a rich ledge has been struck. Drifting is also going on in the Princessa. A rich ledge has been struck on the Grande, one of the Co.'s mines. Major Zimlemon, of the El Paso Co., is erecting hoisting works on the Texas, and that mine will soon be in operation again. It is one of the richest in camp. The Grandota, which was reported last week to be full of water, is again in operation and ore is being constantly taken out. The Elsinore is once more working and ore is being hauled to Lane's mill. Ore from the Aurora is also being taken to Lane's mill. The placers all over the camp, and in Mexican Gulch, which were contemptuously abandoned by tenderfoot many moons ago, as being played out, are still being profitably worked, and considerable dust is found. We state this particularly for the benefit of J. P. Redmond, who declares in the Los Angeles *Express* that the placers of Lower California will not make a man's salt; that he knows, for he has worked in the placers. W. E. Howard came down from San Diego Tuesday, but returned the same evening to purchase a pump and boiler to be used at his Montezuma mine at Alamo.

MONTANA.

THE MOUNTAIN LION, after some unpleasantness with the St. Louis syndicate, has weathered through the middle or main vein, which was cut Thursday of last week. The vein is 3½ feet wide, and the assays are of unusual richness.

THE MINNEAPOLIS has been managed most consistently and has probably as fine showing as any property in Oro Fino with the same amount of development. The property now being worked is developed by a shaft 478 and is now about 70 feet deep. They have a fine ledge on which seven feet of quartz has been exposed.

UNUSUAL ACTIVITY.—*Butte Miner*, Feb. 20: The coming spring will undoubtedly be the commencement of a year of unusual activity in Montana mining circles. Already preparations are being made to resume operations at a number of promising properties in this city and vicinity in a short time. Not only is this the case with individual owners, but companies as well. Nearly all the claims within a radius of two miles of the city have in the past had more or less work done on them. The majority of these claims, however, are now lying idle because of the financial inability of the owners to prosecute work on them as it should be done. Within the past few years men who are familiar with the formation beneath have learned that a depth of at least 500 or 600 feet must be attained before a property will present a paying proposition, and in order to accomplish this end some money must necessarily be expended to start in. Many of the mine-owners here are poor men so to speak, not having more than \$50,000 or \$100,000 at their command, and do not care to take chances, while the properties owned by the large companies are being developed as they are needed. At the present stage of the game it is safe to remark that not one mine hereabout on which a depth of 600 feet has been reached has proved a failure, thus demonstrating that if the proper depth is attained on a piece of ground in this district a mine is bound to reward the efforts of the prospectors. The anticipated activity for the coming year is due to three causes—the rise in copper, the high price of silver and the knowledge mining men in general now have of the necessity of going deep enough for the ore.

PLACERS.—*Madisonian*, Feb. 22: The outlook for a good season of placer mining has not been better for several years than it is now. The deep snow in the mountains has drifted into the ravines by heavy winds, and is stored there to stay until the time arrives when it will do the most good in ground-sluicing, etc.

OREGON.

GRANT'S PASS.—*Cor. Rogue River Courier*, Feb. 20: There are several discoveries of croppings of galena and galena sulphurets that are very promising; and I have examined several specimens of silver ores, carrying chlorides and copper-stain that were very rich. From reliable reports there are some large lodes of these ores, prospected and partly developed. I have also noticed that nearly all of the gold-bearing quartz carries a large percentage of sulphurets carrying gold. Now all these facts, if generally known to the mining world, should interest capital in erecting a plant for sampling, milling and smelting works, more profitable than at any other point in Oregon. It is well known that in many parts of California there are many mines rich in chlorides that would be of immense value if the galena mines or the fluxes were at hand necessary

to work them. Many miles of the mountain ranges in Shasta county, Cal., are of iron formation, carrying a low grade of silver ores, especially those of Iron Mountain mine, that would be very valuable if there were galena mines near by so that ores could be mixed and smelted. Now you have here, around and near Grant's Pass, the mines, the smelting ores and all the fluxes necessary to work them, and a company should be formed to start milling and sampling works to develop these vast deposits of wealth.

WASHINGTON.

THE SILVER DUMP.—*Ellensburg Capital*, Feb. 20: During the past week, E. E. Gooding of Roslyn, president of the Silver Dump Mining Co., was in the city in the interest of his company. He carried some samples of ore from the mine that assay very high in silver, and which indicate that the vein is very rich. A tunnel is in 18 feet, in first-class ore. A shaft will be sunk soon on the vein, which crops out on the surface. At the depth of 100 feet a drift will be run each way on the vein. A wagon-road passes near by, and the mine is very accessible. The company intends to push work on the mine as soon as spring opens, as they think they have a valuable property and are anxious to realize on it.

NEW MEXICO.

RUBY.—*Silver City Enterprise*, Feb. 21: W. C. Tonkin is in with a car of ore from the Ruby, which will be shipped to Socorro. It will average about \$700 per ton. Hand and Casey are prospecting at Cow Springs, and are taking out some very rich ore. Kerr and Mitchell, in the same district, are doing well with their lease. The Surprise mine, Cook's Peak district, has been sold by Col. Carpenter to the El Paso Smelting Co. The mine was owned by Frank Graham and the Crawford estate. Three silver bricks, worth \$1000 each, were shipped from the Little Fanny last week. Fred Risque, the new manager of the Pacific Mining Co., arrived from St. Louis last week, and has been busy investigating the affairs of the company since his arrival. John A. Miller is making a pronounced success of the Nugget, as the frequent shipments of bullion through this city will attest. The mine is certainly paying a handsome profit above expenses, and the property is opening up in such shape as to at once place it in the front rank. What Grant county needs is more mines like the Nugget, and more men with nerve enough to open them up and put them on a paying basis.

Notes of Recent Patents.

Among the patents recently obtained through Dwyer & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

JOURNAL-BOX PROTECTOR.—Henry S. Pugley, Oakland. No. 421,610. Dated Feb. 18, 1890. This invention relates to axle or journal-boxes, especially those which are used in railroad construction. The object of this invention is to protect the inner end of the box so as to prevent the oil or grease from escaping and the dust from entering.

HAIR RESTORER.—W. L. Crooks, Sonoma, and Thimotha Robin, S. F. No. 421,675. Dated Feb. 18, 1890. This is a composition to be used as a hair restorer, composed of beef gall combined with coal tar, soft soap, washing soda, beef grease and water in certain proportions.

STEERING-WHEEL CARRIAGE.—Daniel Beet, San Leandro. No. 421,884. Dated Feb. 18, 1890. The invention relates to the class of steering apparatus specially applicable for road locomotives, traction engines and similar heavy vehicles. The object is to provide a simple and effective steering-wheel carriage, which can be operated easily and with the least amount of friction, at the same time being steady in its action and durable.

ROTARY JOINT.—Wm. F. Bowers, S. F. No. 421,657. Dated Feb. 18, 1890. The object of this invention is to make a tight rotary joint which may be applied to any mechanism where such joint is required. It is especially applicable to forming the necessary steam-tight joint between the steam supply-pipes and the rolls of a calendering machine. It is also applicable to those hose-reels wherein water is admitted to the rotary shaft of the reel on which the hose is wound and with which it communicates, this joint forming the necessary water-tight connection between the supply-pipe and the reel-shaft.

RAISIN-GRADER.—James Porteous, Fresno. No. 421,881. Dated Feb. 18, 1890. This is one of that class of graders for raisins, grapes and other similar materials in which the fruit is fed down from a suitable chute upon an inclined directing board, adjustable to various inclinations, and thence upon a series of shaking screens or sieves, a blast of air being directed on to the board whereby the stems are blown out and the fruit falls back down the board upon the sieves. The object of the improvement in the directing board is to render the cleaning portion of the machine more sensitive and accurate in its operation, adapting it to be adjusted so as to be easily regulated to the peculiar condition of the material passing through.

AXLE LUBRICATOR.—Robert H. Parker, Carson City, Nev. No. 421,886. Dated Feb. 18, 1890. This relates to a device for lubricating the axles of wagons, and it is especially adapted for use upon heavy freight-wagons where it is difficult to remove the wheels for this purpose. It consists of a V-shaped tank fitted into the space between two of the spokes and against the periphery of the hub, and in con-

nection therewith of a pipe and stop-cock and a connection between the same and the interior of the axle-hub. A sufficient quantity of lubricant can be placed in the chamber, or tank, to last a long time, and whenever it is desired to lubricate the axle the stop-cock may be turned at a time when the containing chamber is upon the top of the hub of the wagon; then the stop-cock may be closed and the wagon allowed to go on.

SHIFTER FOR GANO-EDGERS.—Samuel H. Pratt, Brownville, Yuba Co. No. 421,609. Dated Feb. 18, 1890. The essential object of this invention is to provide simple and effective means for shifting any one or more of the saws at the same time and independently of each other.

WHIFFLETREE CONNECTION.—Oliver J. Fisk, Coulterville, Mariposa Co. No. 421,880. Dated Feb. 18, 1890. This is a novel bracket for connecting the single with the doubletree; and there are novel hooks in the end of the singletree for receiving the tngs or braces. The object of the invention is to provide a simple and durable connection between the singletree and the doubletrees, which will enable the former to have a movement entirely free and independent of the latter without interference with it, so as to avoid chafing and being held securely in place.

VISUAL ANNUNCIATOR FOR CALL BOXES.—Paul Seiler, S. F. No. 421,882. Dated Feb. 18, 1890. This invention relates to an annunciator for fire, police and messenger call-boxes; and its object is to announce that the call has been received at the central station in a manner that can be readily understood and not mistaken. The improvement consists in the employment of a visible annunciator or indicator so that the return call or answer from the central office is visible to the eye and the operator does not depend upon the bell or the clicking of an armature. It consists of the setting and tripping device, the latter being operated only after the clockwork has ceased its operation.

GUIDING ATTACHMENT FOR AGRICULTURAL IMPLEMENTS.—Cyrus Packard, Fresno. No. 421,885. Dated Feb. 18, 1890. This is an attachment to plows, harrows, and similar implements, the object of which is to properly guide, direct or steer them. It consists of peculiarly formed guide-arms, which in operation enter the ground to the proper depth, according to adjustment, and guide the cultivator or other implement to the line of travel, preventing it from jumping about and injuring the trees or vines of an orchard or vineyard.

MIXING APPARATUS.—Geo. W. Swan, S. F., assignor of one-fourth to Warren B. Ewer. No. 421,883. Dated Feb. 18, 1890. This is an apparatus for mixing substances having a wide range of volatility. It is especially intended to mix the materials which are employed to form a paint or covering compound, which consists of a mixture of benzine with a paraffin or with the residue which is left after the distillation of the lighter hydrocarbons from crude petroleum. It is necessary in mixing these ingredients to mix at a temperature which is sufficient to melt the paraffin or resins, and it will be manifest that under ordinary conditions it will be impossible to mix the volatile benzine with the heavy and highly-heated solid material, because the benzine will be evaporated and driven off before it is possible to make the mixture. This invention is designed to overcome this difficulty by providing a closed tank or chamber with means for melting the solid material and maintaining it in a melted condition, a means for introducing the benzine and incorporating it with this material, a means for conveying away and condensing that portion of the benzine which is volatilized during the process, and also a means for cooling the upper portion of the chamber, to prevent a too rapid volatilization of the benzine after the mixing is completed.

SAWDUST BURNER.—Frederick W. Cook, S. F. No. 421,555. Dated Feb. 18, 1890. This is a burner for disposing of sawdust and other refuse. It consists in a fire wall, preferably in the form of a semi-circle and partially inclosing a space within which the sawdust is fed, and in connection with said wall a blast-pipe with connected flue under the charge of sawdust and provided with backwardly directed exit apertures, whereby the flue is prevented from becoming clogged and the wall is not subjected to intense heat. The invention further consists in connection with the said wall and blast apparatus, of a carrier for conveying the sawdust to the top of the wall and a chute for depositing it within the space partially inclosed by the wall.

List of U. S. Patents for Pacific Coast Inventors.

The following brief list by telegraph, for Feb. 25, will appear more complete on receipt of mail advices:

California.—John B. Yount, Dixon, device for laying out orchards; Thomas L. Williams, Big Bend, carriage-jack; Abner C. James, Pomona, shoe-lacer; Chauncey W. Gibson, S. F., leverage carbonizer; Matthias S. Dickinson, Los Angeles, driving-rein; Harry R. Ekstrom, Santa Rosa, assignor of half to A. F. Chisolm of Los Angeles, cannon-wheel remover; John T. Charest, Red Bluff, assignor of a third to J. Marcott of San Jose, water-proof attachment for boilers; John A. Beals, assignor to E. S. Delamater, Los Angeles, oil-burner.

MECHANICAL PROGRESS.

A New and Perfected Axe.

American mechanics have always excelled in the manufacture of axes. Even Mr. Gladstone, with all his attachment for almost everything English, prefers the American to the English axe for both exercise and execution. Until now it has been generally supposed that no improvement could be made on this most useful and universal tool; but within the last three or four years Mr. W. C. Kelly, son of the American inventor of the Bessemer process, has devised a change in the shape, which will at once be recognized as a most important modification. He has been at work upon his invention and the machinery for its production for some four years and has just reached what he considers its final perfection.

The blade of the axe as now generally made presents a generally smooth face upon either side, which hugs close to the wood as it enters, and when driven well into soft wood is extracted only with great difficulty.

The perfected axe has both sides of the blade scooped out or cut away from near the edge to where the handle enters, so that the only part of the surface which comes in contact with the wood so as to afford friction or resistance either in entering or in being withdrawn is a triangular-shaped surface on both sides, the lower part of which forms the edge and running up to, or nearly to, a point in the center of the pole under the opening for the handle. This raised and triangular-shaped face is referred to by the inventor as "hurling the chip," and it is stated that, no matter if the axe is driven to the eye in the wood, it cannot stick or bind in the timber, but can readily be loosened without breaking or bending the handle. Another advantage resulting from the idea of the blade being thin is that the axe does not become stubbed as it wears away, but can be kept in order and nearly the original shape by merely grinding the cutting edge. The axe is described as made entirely of steel, the pole being of soft steel and the blade of the finest grade extra double-refined cast steel. It is forged and tempered with natural gas, and the company allude to this heat as giving a better temper than can be obtained from charcoal or any other fuel. The axe is thus put on the market with high claims as to the excellence of its shape, which is regarded as giving important advantages over others, and also with claims as to its excellence of material and workmanship. It is said that the company are receiving many letters from practical woodchoppers which express their satisfaction with it, and indicating that its use is attended with much less fatigue than the ordinary axe, the reason being, as they express it, that the axe cuts deeper into the wood with less labor, and is easily extracted. This tool will be known as "the Kelly perfected axe."

American Ability to Build War Ships.

The Chicago *Journal of Commerce* says: Irving M. Scott, general manager of the Union Iron Works of San Francisco, the leading shipbuilding firm on the Pacific Coast, was before the Naval Affairs Committee of Congress quite recently, and made some interesting statements with regard to the ability of this country to produce all kinds of war ships. He said that when the Charleston was built the steel works in this country were unable to supply the hollow shafts needed, and these had to be procured abroad. The policy insisted upon by Congress of compelling the purchase of American materials as far as possible had, however, encouraged capital to invest money in the expansion of works in this country, with the result that the shafts for the San Francisco, begun not long after the Charleston, were procured at the Bethlehem Iron Works in Pennsylvania, and not at the Krupp Works in Germany. The American shafts were superior to the foreign make, the shafts in the San Francisco showing 73,000 pounds' tensile strength and 35 per cent elongation against 68,000 pounds' tensile strength and 28 per cent elongation for the shafts in the Charleston. The Union Iron Works can now furnish all the steel castings needed in the construction of a first-class war vessel, with the exception of the plates and shafts, which have to be secured from the Bethlehem Works. These latter works are in many respects the most complete in the world and capable of the heaviest work. At Bethlehem there are larger hammers and more powerful compressing machines than at Whitworth's or Crook's in England, or Cruzet's in France. Bethlehem has a 125-ton hammer, while Whitworth's largest is 98 tons.

A PROGRESSIVE HALF-CENTURY.—Those of us not yet 50 years of age have probably lived in the most important and intellectually progressive period of human history, remarks *Iron* of London. Within this half-century the following inventions and discoveries have either been placed before the world or elaborated: Ocean steamships, railways, street tramways, telegraph lines, ocean cables, telephone, phonograph, photography and a score of new methods of picture-making; aniline colors, kerosene oil, electric lights, steam fire engines, chemical fire-extinguishers; anesthetics and painless surgery; gun-cotton, nitro-glycerine, dynamite and a host of other explosives; aluminum, magnesium and other new metals; electro-plating,

spectrum analysis and the spectroscopic; and, pneumatic tubes, electric motors, electric railways, electric bells, typewriters, cheap postal system, steam heating, steam and hydraulic elevators, vestibule cars, cantilever bridges. These are only a few out of a multitude. All positive knowledge of the physical constitution of planetary and stellar worlds has also been attained within this period.

SOME CHANGES IN HARDWARE.—The changes in hardware during the past nine months, says the *Age of Steel*, have been cumulative in effect, and are fast bringing a new order of things into existence. In builders' hardware, many of the new designs are remarkable for their beauty of finish and artistic conception. The trimming of a house with the proper hardware—a subject so long neglected—has now assumed its true importance, and is as much the subject of personal choice on the part of the owner as anything else connected with the building. In bronze goods especially there is an increasing demand for the best and handsomest that can be made, the question of price being no consideration whatever. The new steel lock has made a favorable impression, and seems destined to hold a permanent place. The substitution of mild steel for wrought iron has gone on at a very rapid rate. In huts and hinges it is universal—it has partly made its way into bolts and tacks, and in numerous small articles it has proved its superiority. In tensile strength and toughness it compares with the best imported Norway and Swedish brands, and the days of wrought-iron goods are clearly numbered. The wire nail grows steadily in favor. In consequence of its capacity for being barbed, and being furnished with almost any head or point desired, its usefulness is increased a hundred-fold. Its latest form is the wire screw nail—a very practical combination of the wire nail and the regular screw. Owing to the advance in prices, the prospects of the steel nail are brighter, but the question of gauge still remains unsettled. The new gauge has been adopted by only a few mills, and it must receive the verdict of the consumer before it can be said to be a success. The chances are for a compromise between the old and new gauges.

IMPROVEMENTS IN BACK STEEL.—"Back steel," so-called, is a flat bar steel, having one side highly carbonized, and the opposite side comparatively free from carbon. Such steel is said to be tenacious when in use where great rotary force or heavy blows or strains are required, and less liable to break or crack while hardening. Plates or flat bars of soft steel or fine iron in pairs of equal size are placed back to back with a film of clay or other refractory material interlaid between them. They are then clamped or wired together, and the several pairs are placed "in a receptacle or flask stratified between layers of granulated charcoal." The flask, furnished at one end with an inlet tube, is placed horizontally in a snuff. It is said that Mr. M. A. Howell, Jr., of London, has taken out a patent for improvements in the manufacture of soft back steel.

KEROSENE TO REMOVE SCALE AND RUST.—It is a common thing for engineers to use kerosene to remove the scales which form on the inside of boilers. The oil is poured into an empty boiler, and then the water is turned on. The oil, floating on the water, comes in contact with the scales before the water does. The use of kerosene for this purpose in one of Milwaukee's slaughtering establishments, where the steam is used in cooking ham, beef and mutton, produced unexpected results. The kerosene mingled with the steam, and the cooked meats smelled as though they had been dipped in a petroleum well. It was some time before the cause of the seeming phenomenon was discovered.

A NEW COMPOSITE METAL.—From Cincinnati comes the story that Mr. Hatfield of Newport, Ky., has invented a new composite metal for which almost marvelous properties are claimed. It is composed of pig iron, wrought iron, copper and aluminum, bronze alloy and flux. It is produced direct from the cupola, without annealing, and yet it can be welded and hammered like iron or steel, and can be manufactured, it is claimed, at a less cost than malleable iron or steel castings. At a test made January 20th in Louisville it is said to have endured a tensile strain of 168,000 pounds per square inch, that being the limit of the machine.

AN ENGLISH SHIPYARD FOR AMERICA.—A London cable states that the firm of Armstrongs, gunmakers, intend to establish an immense shipyard in the United States and bid, through Americans interested in the enterprise, for the construction of the ironclad vessels which it is proposed to build for the United States Navy. The claim is made by the Armstrongs that they can profitably compete with the American shipbuilders on their own ground and easily command the American influence necessary to secure contracts.

THE COMING DEMAND FOR STRUCTURAL IRON is said to be very promising. Large amounts will be called for in the elevated railroad work, which is now being projected in near a score of cities. A single scheme of this kind in Baltimore will call for the expenditure of \$30,000,000. Railway terminal facilities are also being largely proposed, which will also absorb large amounts of such iron.

SCIENTIFIC PROGRESS.

New Processes for Producing White Lead.

An English Invention.

A new process for the production of white lead from lead ore has been brought out in England, which promises to be very successful, and to give us cheaper paint as well as cheaper lead. The process follows, in the main, the Bessemer method of making steel, the oxidation being produced by air instead of acids. The method, it is claimed, is not poisonous to workmen, as the old acid process is, and the product is declared to be better as well as cheaper.

"Another New Process—An American Invention."

Simultaneously with the announcement of the above English invention, the *Electrical World* of New York describes a process for producing white lead by means of electricity, which has just been patented by Mr. T. D. Bottom of Hoosick, New York.

The process devised by Mr. Bottom consists in electrolytically dissolving a lead electrode in an electrolyte containing nascent or free carbon dioxide, whereby the lead compound formed by electrolytic action is precipitated to form hydrated carbonate of lead, or pure white lead, which is then removed, washed and dried.

The manner in which this is accomplished is as follows: The electrolytic solution is prepared by dissolving in the proportion one-half pound each of sodium nitrate and ammonium nitrate to one gallon of water, and then saturating the solution thus formed with carbon dioxide, which can be done in various ways. Sodium carbonate and ammonium carbonate may be used in the place of the nitrate; but in that case nitric acid must be added until the bath is about neutral, which results in the larger portion of the carbon dioxide being driven off during effervescence. The electrolytic solution is then placed in a tank and electrodes of metallic lead are immersed in the same. The electrodes are then connected to the generating dynamo, and a current density of about 15 amperes per square foot of anode surface is maintained. Upon the passage of such a current between the electrodes through the bath, the white lead begins to fall very rapidly. As the carbon dioxide is taken up from the bath to form the hydrated carbonate of lead, it is, of course, necessary to have the bath replenished with additional carbon dioxide as the process continues. This can be done in several ways. A convenient way in doing this consists in burning limestone, washing the gas produced by the dissociation of the constituents of the limestone, and supplying the gas directly to the bath.

The white lead is from time to time removed from the tank, wetted and dried, and on being mixed with a suitable oil into a paint it is found to have much greater covering properties than ordinary commercial white lead formed by dissolving lead in acetic acid in the presence of carbonic acid, since the latter is slightly crystalline and less opaque than the hydrated carbonate produced by the action of carbonic acid on the lead. By this process the lead is dissolved at the rate of 59.52 grains per ampere per hour.

Electrification of a Steam Jet.

The following is a brief abstract of a paper recently read before the Physical Society of London, by Shelford Bidwell:

The author showed that the capacity of steam issuing from a nozzle is greatly increased by bringing electrified points near it, and that its color is changed to orange brown. Electrified halls and disks when placed in the steam produce similar effects, and when these are connected with an influence machine at work, the decoloration of the jet rapidly responds to each spark. On examining the absorption spectrum of the unelectrified jet, little or no selective absorption was detected, but on electrification the violet disappeared, the blue and green were diminished, and the orange and red remained unchanged.

From these results the author concludes that electrification causes an increase in the size of the water particles in the steam, from something small, compared to the wave length of light, to about 1.50,000" in diameter. Allied phenomena with water jets have been observed by Lord Rayleigh, who found that a straggling water jet is rendered much more coherent by bringing a rubbed stick of sealing-wax near it. These observations are of considerable meteorological interest, for the steam jet phenomena go far toward explaining the cause of the intense darkness of thunder clouds, and of the lurid yellow light with which that darkness is frequently tempered.

After making his experiments, the author learned that similar observations had recently been made by the late Robert Helmholtz, who viewed the steam jets by reflected light against a dark background. On electrification the jets became much better defined, and presented diffraction colors. Luminous flames also produced similar effects, and Mr. Bidwell has found that glowing touch-paper is equally efficient.

Helmholtz conjectures that the sudden condensation may be due to molecular tremors or shocks imparted by the electrification upsetting

the unstable equilibrium of the supersaturated vapor, just as a supersaturated saline solution is suddenly crystallized when disturbed. Another hypothesis suggests that condensation is caused by the introduction of solid matter into the jet by the exciting cause, thus providing nuclei upon which the vapor may condense.

On reading Helmholtz's paper, the author tried the effect of gas flames on water jets, and found that when luminous they influenced the jet considerably, whereas non-luminous flames had no appreciable effect. He also found that luminous flames are positively electrified, and demonstrated this before the meeting.

Prof. Rucker, in discussing the paper, said that he thought the surface tension of the films surrounding the water jets would be modified by the presence of an electrified body, and that the smoke from the touch paper used in some of the experiments on steam jets would introduce solid particles and facilitate condensation. Prof. S. P. Thompson commented on the contrast between Mr. Bidwell's experiments and those of Dr. Lodge on the dissipation of fog by electricity, and also asked whether the color of the jet depended on the length of spark produced by the machine. Prof. Forbes thought a crucial test between the two hypotheses of Helmholtz could be obtained by trying the experiment in a germless globe. The president, Prof. Rhinold, said he had recently noticed that gas flames were electrified.

Mr. Bidwell, in reply, said he might have mentioned that the effect of flames on jets may be due to dirt, for if soap or milk be added to the water in the steam generator no effect is produced by electrification or flame. As to change of color with spark length, little, if any, variation is caused thereby. He had not tried whether a red-hot iron produced any effect on a steam jet.

POWDERED MILK.—A Swiss savant has made a discovery which seems almost to reverse known natural laws. He reduces milk to a dry powder in such a manner that by the addition of water it at once assumes all its natural properties. It is claimed that milk in this form is much better than condensed milk for one reason—it has no sugar in it. It is well known that condensed milk cannot be used in many departments of cooking on account of this sugar, and this also makes it objectionable for use with very young children, not that sugar itself is injurious to babies, for it is always put into their milk, we believe, but it is better that this sugar be put in fresh at the time of preparing milk for the child. How far this powdered milk will answer these objects remains to be seen. One thing is certain, the powder would be much better for transportation and more handy to have in the house than either plain or condensed milk, provided it is a success. It looks somewhat dubious as a complete substitute for plain milk, not only on account of necessary expense, but we do not find any kind of food capable of being thoroughly dried and afterward made over with water so as to closely resemble the original article, and we never expect to see it done with cow's milk. Nature has a way of mingling these things that thus far man has not been able to closely imitate. This invention is due to Dr. Krueger, a Swiss savant, and under his management a company has been organized to make milk powder in Switzerland.

NATURAL GAS AND COLD WEATHER.—The natural gas supply for heating one of the public schools at Pittsburg, one cold morning last week, gave out, and the flow was not resumed for several hours. In explanation, an official said: "There is always a scarcity of gas when the weather suddenly becomes cold, but the number of complaints we have received is comparatively small. Very often the scarcity of gas is due to some local trouble like the freezing up or breaking of a pipe. We have plenty of gas, but it always contracts in very cold weather. As to the possibility of gas giving out at its source, attention is called to a well in the Titusville region, the first, in fact, from which gas was piped, and which, after a service of 15 years, is flowing as freely as ever. The people in Western Pennsylvania who have used gas for so many years, have ceased to feel alarm at the possibility of the fuel giving out, though occasionally the subject is discussed for speculative and other purposes."—*Pittsburg Pottery*.

DEVICE FOR REGISTERING THE SPEED OF VESSELS.—The principle of the anemometer, the instrument which is generally used for measuring the velocity of the wind, and which is, essentially, a small, delicately poised, self-registering windmill, with flat or cup-shaped arms, has been applied to a device for registering the speed of vessels. The little mill, made very strong and protected as far as possible, without interfering with its accuracy, from accidental blows, is placed under the keel of the vessel amidships. Its velocity varies, of course, with the varying speed of the vessel, and its motion is communicated to a small vertical shaft which passes up through the ship to a point on deck, where the number of revolutions is registered upon a properly constructed dial.

LIQUEFYING OZONE.—O'zewski, the Russian physicist, has succeeded in liquefying efficient ozone to determine the boiling point, which is -159 Fahr. The liquid ozone is dark blue in color, and is nearly opaque in a layer of a tenth of an inch thick.

GOOD HEALTH.

Dosimetry.

EDITORS PRESS:—Permit me to make a few comments on an article entitled "Drugs and Doctors," which appeared in your issue of January 25, 1890. It is true that there are to-day many physicians, who, like Drs. Holmes and Welch, are skeptical as to the power of drugs in the treatment of diseases. I believe that this feeling has arisen from the disappointments caused by the uncertain activity of medicaments in general use. The ordinary preparations of pharmacy, such as tinctures, extracts, decoctions and infusions, do not give us the exact strength and activity of drugs. Many times poisonous, they have also often proved inert. The variability of the therapeutic power of medicinal agents depends on conditions affecting the growth and cultivation of plants, their degree of freshness and maturity. Such variability must make the dosage uncertain, and therein lies one great cause of the skepticism displayed to-day in the ranks of the profession. Another cause is that while great attention has been paid to pathology, physiology and chemistry, the science of therapeutics, which is the corner-stone of medicine, has been neglected and misunderstood. It is the stone on which the profession has split, and which has led to the formation of schools differing widely in practice.

But however slow the advance in this branch, however acrimonious the disputes over the various systems in use to-day, we need not despair. A ray of light has at last appeared which will do much toward clearing up uncertainties and soothing the ruffled feelings of the various disputants. If allopathy has been denounced for its enormous doses, homeopathy has erred also by plunging into the ethereal depths of mysticism, thus practically acknowledging medical nihilism.

Chemistry and physiology are making wonderful progress in clearing away the cobwebs of doubt and obscurity in the treatment of diseases. Chemistry, by isolating the active principles of drugs, is giving us agents of definite power and activity, and physiological experiments are teaching us the mode of action of these agents.

The discovery of quinine has given an impetus to chemical researches, and to-day we possess quite a number of substances representing the active principles of plants.

Up to the present, the science of therapeutics has been running in the deep rut of empiricism and routine, owing to the uncertain and dangerous preparations of pharmacy, but the use of the active principles of plants, or alkaloids as they are called, has operated a most beneficial change in the practice of medicine. Medical nihilism or fatalism, which had so largely invaded the ranks of the profession, is giving way to renewed faith in the powers of medicinal agents, thanks to the more extended introduction of those active medicaments in the treatment of diseases.

Prof. Burggräve of the University of Ghent, in boldly proclaiming the errors of polypharmacy and the hinderer method of prescription, has rendered a great service to medicine and humanity. The dosimetric method of therapeutics introduced by this energetic worker in the fields of medicine about 20 years ago is now coming to the front, after much opposition and elight. In advocating the use of the alkaloids and teaching the proper way of using them, this method has lifted medicine out of the mire of uncertainty and skepticism. It replaces routine practice by one characterized by activity and precision. It is the condemnation of expectancy and nihilism in the treatment of diseases.

The great principle enunciated by the professor of Ghent is clear: "To acute diseases, oppose an acute treatment; to chronic diseases, one adapted to the march of the disease." The regulation of acute diseases is the cardinal principle of dosimetry. There are two periods in disease—a first or dynamic, and a second or organic. In the primitive stage, all diseases resemble each other; the prominent symptom is fever, as shown by accelerated pulse and increased temperature, and it is against this primitive phase that the regulatory treatment is directed. If we at once restore the disturbed equilibrium by the use of pure and active medicaments, such as the alkaloids, the patient is saved from the organic changes which are sure to follow the first stage if not treated energetically. The secondary or organic phase of disease constitutes the grave side of the affection against which medicine has at best but uncertain means.

Another cardinal principle of the dosimetric method is the mode of using the alkaloids. In attempting the regulation of diseases, there is a dominating point to be reached in the administration of these powerful medicaments in order to obtain the desired effect. The rule is to give them in minute doses, at short intervals, stroke after stroke, until the morbid symptoms are controlled. This rule gives the practitioner a precise and active mode of treatment which enables him to vanquish disease in its first stage and prevent those pathological changes which so often endanger life.

In a limited communication like this one, it is impossible to enter into a fuller explanation

of this most valuable method, and I will refer any one desirous of further information to a paper which I read before the San Francisco County Medical Society, and which was published in the January number of the *Pacific Medical Journal*. The dosimetric method is now followed by thousands of physicians in the Old and New World, and its adherents are increasing rapidly in numbers. At a late session of the Paris Academy of Medicine, the value of alkaloidal therapeutics was discussed and recognized, thus paying homage to the labors of the great professor of Ghent, Dr. Burggräve.

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USEFUL INFORMATION.

A CURIOUS RELIC.—E. S. Wilson, a blacksmith of Oark, Mo., has a relic of the Marchfield cyclone, which occurred on April 13, 1880, that is a very remarkable curiosity. This witness of one of the freaks of the great storm is a black quart bottle, bent by some mysterious force into an elliptic circle without a crack or break in the glass that the closest scrutiny can discover. The neck of the bottle actually touches the edge of the bottom, and the feet that the glass was not broken in any way by the force of the storm is shown by its holding water or any other fluid. By gradually turning the bottle as the water is poured in, it can be nearly filled to its full capacity, so as to show the perfect soundness of the material. The bottle was found by Mr. Wilson the day after the Marchfield disaster, and examined by Prof. Tice. The meteorologist attributed the bending of the bottle to the force of electricity, and considered this one of the most wonderful results of the agency at work in the storm-cloud. The bottle was found in the wreck of one of the Marchfield drug stores.—*Ex.*

TO STOP A HORSE OR COW FROM JUMPING.—You can easily stop a horse or cow from jumping fences when out at pasture in this way: Put a strap, with a ring on it, around the near foreleg, above the knee, and a surcingle or belt with a ring around the body. Then, by a short strap or piece of rope, attach the two rings so as to make a harmless yet perfectly effective hobble. Halter-pulling in the stall may be effectually and easily broken. Put a slip-noosed rope around the body, lead the end of it between the animal's forelegs up through the halter, and make it fast to the manger. Then go up in the loft and throw down a lot of clattering tin pans into the manger. When the horse jumps back the rope will catch him and bring him forward. It will not be long before you cannot make him jump back.—*Ex.*

TESTS FOR UNDERWEAR.—A new method of testing woolen garments is by putting caustic soda into a cup of water and dipping the article whose genuineness is doubted into the mixture, of course being careful not to touch the liquid. The caustic soda will quickly eat animal fibers, but has no effect upon those of vegetable origin. If the article is all wool, it will be dissolved in the liquid, leaving nothing but a trace of coloring matter. If the material is cotton, it comes out unscathed. When the material is wool supported by a framework of cotton, the latter being distinguishable to the eye or by ordinary tests, the caustic soda quickly divorces the two, dissolves the wool and leaves the cotton as clean as if it had been woven by itself.

TO WASH POCKET HANDKERCHIEFS.—Wash all good pocket handkerchiefs by themselves, quite apart from the other things. Soak them over night in cold water, then wash them in good hot water, using the best white soap; rinse them in clear cold water, squeeze the cold water out of them, rub well with white soap, and boil them for 20 minutes, with some lump borax in the water. Then rinse them again, and if any spots remain, wash them. Blue in the usual manner, and iron before they are quite dry with a well-polished hot iron. Handkerchiefs treated in this way will wear better, and will keep their color even when they are in rags.

THE LATEST and most unique invention is a machine for buttering bread. It is used in connection with a great patent bread-cutter, and is intended for use in prisons, workhouses and other reformatory institutions. There is a cylindrical-shaped brush which is fed with butter and lays a thin layer on the bread as it comes from the cutter. The machine can be worked by hand, steam, or electricity, and has a capacity of cutting and buttering 750 loaves of bread an hour. The saving of butter and of bread, and the decrease in the quantity of crumbs, is said to be very large.

A NEW AND ARTISTIC IDEA has been introduced at dinner parties lately. The knives and forks are all different, and each one made after some special design. Diminutive copies of antique German and Turkish swords serve the guests as mace-bearers for knives, matched with tiny daggers of Italian pattern given to those of the sex feminine.

THE manufacture of luminous paint has been begun in Austria on a large scale, at about a sixth of the cost hitherto. A special paper is supplied for use when the paint is applied to walls,

ELECTRICITY.

The Deterioration of Electrical Conductors.

A correspondent of *La Lumière Electrique* gives an account of some of his observations on the deterioration of copper conductors by the long-continued passage of strong currents of electricity through them. His attention was first called to the question in 1884, when he examined the electrical and mechanical properties of some pieces of electric-lighting cables that had been in use for some years. One specimen which had been in use for 20 years gave very striking results. It was extremely brittle, and broke in fragments under the hammer, while its fractured surface resembled in all particulars that of electrolytic copper. The current through this cable had not been in any way excessive, nor had it been subjected to any heavy mechanical straining. Similar though less marked results were obtained with other cables, which had been in use for shorter spaces of time. The currents in all these cases were direct; but he afterward had an opportunity of examining the effects produced by an alternating current. This wire had become very brittle; its electrical resistance, moreover, had increased about 31 per cent. It was then determined to make some systematic experiments on this subject. He endeavored in the first place to determine whether the long-continued passage of a powerful current of electricity caused any expansion of the wire, and secondly, whether end in what degree it altered the elastic properties of the material.

These experiments are very elaborate and very carefully made, and have not yet been completed. During the first nine months of the four years of their continuance the observations showed a want of uniformity, but since then have been very regular, and the results now published show that the elastic properties of the wire have been very considerably changed. This variation takes place the more rapidly with strong than with weak currents, and with alternating than with direct.

INCREASING USES OF ELECTRICITY.—The increase in the use of electric lights and electric motors is shown by the *Electrical World* to be greater during the past few years than most people probably imagine. The number of electric-lighting companies in the United States and Canada operating central stations at the beginning of 1886 was 450. This number had increased at the beginning of 1887 to 750, at the beginning of 1889 to nearly 1200, and at the beginning of 1890 to 1277, including 25 in Mexico and Central America. Meantime 266 gas companies had engaged in electric lighting, so that the total number of companies engaged in electric lighting at present is 1543. The number of isolated or private incandescent and arc light plants at the beginning of 1887 was about 1000 each. Now there are 3925 private plants in the United States, 175 in Canada and 200 in Mexico and Central America, making 4300 in all. The number of arc lamps in use in 1882 was 6000. This number doubled each year for four years and has since grown rapidly until there are now 235,000 arc lamps in use. The number of incandescent lights has increased from 525,000 in November, 1886, to 3,000,000 at present. The number of electric motors now in operation in the country is estimated at 15,000. There are nearly 200 electric railways in over 125 towns and cities, and these have in operation or under contract 1884 cars on 1260 miles of track. These motors find their greatest application in connection with electric-light plants. Electricians, however, look for a great development of electric motors for railroads of all kinds during the next two years. Electric light and electric power for mining is a new development of considerable promise. The electric tramway and electric power for pumping, drilling, cutting, etc., have already been adopted to some extent with good results.

ELECTRIFIED STEAM.—At the last meeting of the Physical Society of London, the members were much interested in some very beautiful experiments of Mr. Shelford Bidwell, F. R. S. In one of these experiments a powerful electric light cast a shadow of a steam jet upon a screen, but the shadow was barely visible, nor did it appear very brilliant under the illumination. A needle-point was then held near the jet and electrified by being connected with a Wimshurst machine. Instantly the shadow became conspicuous and of a dark brown color, while the jet itself became far more luminous and occasionally colored. The effect of the electrification is apparently instantaneous. It is probable that the explanation may be closely connected with Lord Raleigh's well-known experiment of electrifying a jet of water, which then ceases to cohere and fell in small drops, but instead draws itself together and falls in large falling drops. As Lord Raleigh's experiments explain the large drops associated with a thunderstorm, so Mr. Bidwell's seem to throw some light upon the cause of the extraordinary blackness of the thunder clouds and of the lurid light so often seen in the sky before a storm.

MINING HAULAGE, ETC., BY ELECTRIC MOTORS is a matter which is just now exciting considerable interest among mining men, particu-

larly in coal mines. The machinery employed is very compact and occupies much less space than that required for either steam or animal haulage. Now that electric motors have become a commercial article and have been proven to be perfectly practical, we may soon look for a very general use for them everywhere. The number of electric motors, large and small, now in use in this country, is estimated at 15,000, many of which are from 15 to 50 horsepower.

THE NATIONAL ELECTRIC LIGHT ASSOCIATION held its annual meeting during the second week in February, at which a large number of valuable papers were read on various subjects connected with electric matters in general. The public proceedings have not yet reached this coast.

ELECTRIC LIGHT WITHOUT DYNAMOS.—A dispatch from Berlin, dated Feb. 19th, says that Henry Weigert, a Berlin banker, has just taken out a patent in Germany for the production of an electric light without the use of either dynamos or accumulators.

THE BUILDER.

NEW STYLE OF FLOORING.—BEDDING IN ASPHALT.—A curious method of laying floors has been adopted in France and obtained a wide application. It consists in embodying the flooring in asphalt. The new floors are used mostly for the ground stories of barracks, hospitals, and for churches and courts of law. For the floors in question, pieces of oak, usually 2½ by 4 inches broad, 12 to 30 inches long and 1 inch thick, are pressed down into a layer of hot asphalt, not quite half an inch thick, in the well-known herring-bone pattern. To insure a complete adhesion of the wood to the asphalt and obtain the smallest possible joints, the edges of the pieces of wood are planed down, beveling toward the bottom, so that their section becomes wedge-like. Nails, of course, are not necessary, and a perfectly level surface may be given to the flooring by planing after the laying down. The advantages of this flooring, which only requires an even bed on which to rest, are said to be the following: 1. Dampness from below and the rotting of boards is prevented. 2. Floors may be cleaned quickly and with the least amount of water, inuring rapid drying. 3. Vermin cannot accumulate in the joints. 4. Unhealthy exhalations from the soil cannot penetrate into the rooms. Asphalt being impermeable to damp, rooms become perfectly healthy, even if they are not vaulted underneath. In buildings with several stories, as in hospitals, the vitiated air of the lower rooms cannot ascend, an object which has hitherto not been possible to attain by any other means known. 5. The layer of asphalt will also prevent the spreading of fire from one floor to another in case of conflagration. The flooring described has been laid in the numerous casemates of the forts around Metz, to the satisfaction of the authorities. The cost is about 25 cents per square foot. This estimate, somewhat high, would be much lower in districts where oak and labor are cheaper, and the distance from places of construction less.—*Builder and Woodworker.*

BUILDING IN SAN FRANCISCO IN 1889.—Although during the year 1889 there were not quite so many buildings erected in this city as in the preceding year, the builders and carpenters enjoyed a 12-months' season of prosperity. Building material was cheap and wages were about the average. The real estate market was in a quite active condition, and purchasers of land were not slow to improve the property which they had purchased. According to a summary which the editor of the *California Architect and Building News* has prepared, the number and value of buildings erected in San Francisco during 1889 were as follows: Frame buildings, 841, valued at \$4,194,641; brick buildings, 36, valued at \$2,073,329; additions and repairs, 204, valued at \$755,855; total number, 1081, valued at \$6,963,825. Besides the buildings and repairs above noted, the other improvements in the city have aggregated \$500,000, making a grand total for the year of say \$7,500,000 in the city, being far in excess in value of any preceding year, although not in the number of buildings. The value of buildings erected for each year from 1880 to 1888, inclusive, will be found interesting, for comparison, as showing the regular and rapid increase of values in this direction. We copy as follows: \$1,754,435; \$3,790,732; \$3,896,212; \$5,261,689; \$6,202,807; \$7,043,999; \$6,401,669; \$6,605,054; \$6,244,220.

A MAGNIFICENT STRUCTURE.—Plans have been perfected in Chicago for the building of a Masonic temple at the corner of State and Randolph streets. The building will be the finest of the kind in the world, and will cost \$2,500,000, and cover a quarter of a block. The movement for a new Masonic temple in San Francisco is taking a definite shape.

MARVELS OF MODERN BUILDING.—The marvels of modern building seem to be without end. The contractors take hold of a five or six story structure of brick, stone and mortar, push it up, lower it, change its entire character, and remodel it without apparently disturbing the lines of safety or utility. Apparently nothing baffles the modern builder.



A. T. DEWEY.

W. B. EWER.

DEWEY & CO., Publishers.

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W. B. EWER..... SENIOR EDITOR

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SAN FRANCISCO:

Saturday, March 1, 1890.

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Business Announcements.

[NEW THIS ISSUE.]

Machinery for Sale.—J. C. Rued.
Delinquent Sale Notice.—Gray Eagle Mining Co.
Flax Packing.—W. T. Y. Schenck.
Stamp Mills and Ore Separators.—A. P. Granger, Denver.
See Advertising Columns.

Passing Events.

The bursting of the Walnut Grove dam, Arizona, by which many lives were lost and much property destroyed, while a most deplorable event, will serve also as a warning for the future. Competent men informed the company of its improper construction and consequent unsafety, but the advice was disregarded. It was built in a cheap way and not fit for its purpose, as the result shows. As there are intentions of building dams in many places, the companies which undertake them ought to be compelled by law to carry on the work so as to afford protection to those who might be endangered by failure.

The miners along the Klamath have had hard luck this winter, having lost their wheels, derricks and other portions of their mining outfits by unprecedented floods.

Underground work at the Grass Valley mines, the center of the quartz industry of the State, is stopped. Water-power is wanting, the ditches being broken. Some of the mines are pumping by steam. They have great quantities of water to contend with this winter.

At Tunnel 9 on the Oregon line, where great landslides have occurred, in order to remove the earth, they have put in hydraulic apparatus of 13 steam force-pumps, which is now doing

the work of 600 men daily. The apparatus has a capacity of 3500 gallons a minute, and the giant nozzle is now discharging about 2500 gallons a minute, sluicing the earth into a level space along the river.

Dividends and Stock Fluctuations.

They are just beginning to find out a few things about mining stock exchanges in Colorado. They have not been able to understand why a mine that pays regular dividends has no special attractions on the Denver Exchange, and that speculative stocks are preferred. This has been the case for 20 years in our local stock exchange. The prices of the dividend-payers are more steady than those stocks which never paid dividends and never expect to. The brokers and dealers don't care a button about dividends in stocks. They make their money from fluctuations in the market value of the stock, not the actual value of the mine itself. The latter interests them not at all. In fact, if there were a fixed value on a mine, the stock would also have a fixed value, and the brokers would have no use for it.

While the original intention of stock exchanges was to sell stock so the respective mines could be developed, they have long since lost sight of that feature. The stock is bought and sold as a gamble or speculation, with very little reference to the mine itself. The companies once having sold the stock have no interest whatever in it, unless the individual owners fail to pay assessments, and it comes back into the company's possession. They would much rather have the assessments paid than to have the stock back.

We have realized this matter so many years here in California, that since we settled down to legitimate mining the California gold mines do not appear on the stock boards. In fact it is rather to the detriment of a gold mine to have it listed. The stocks dealt in here are mainly those of Nevada silver mines. Many of those called on the boards never paid any dividends, and it would be a matter of surprise if they should. It is not expected of them. Of course this is not always the case, but it is as a general thing. Ore developments, or promise of developments, influence the stock, but as soon as a mine settles down to a regular dividend basis its value becomes too fixed to admit of such speculation as the brokers and dealers desire.

The Mechanics' Institute.

The annual election of the Mechanics' Institute on Tuesday was a warmly contested one, there having been two tickets in the field. The total vote cast was 1295, of which the nominees on the Regular ticket received the following: David Kerr, 709 votes; A. W. Starbird, 735; Geo. H. Hopps, 693; A. W. Scott, 698; Robert Ewing, 696; J. K. Firth, 730; W. T. Y. Schenck, 701. The vote cast for the opposition or Members' ticket was as follows: Chas. L. Taylor, 602; Henry Root, 608; Benjamin Marshall, 595; A. P. Flagler, 554; W. A. Beatty, 567; James H. Barry, 550; Charles Elliott, 614.

As stating the position of the elected officers with relation to the officers of the Institute, we reprint the following circular issued before the election:

There having appeared in the daily papers statements reflecting on the directory of the Institute, a plain statement of facts becomes necessary, in order that no member may be misled.

The majority of the present directors and nominees have been in the board for a number of terms—in fact, since the erection of the present pavilion on Larkin street.

In the year 1879, the assets of the Institute were fairly estimated at \$204,969; the number of books in the library, 27,026 volumes; number of members, 1767.

At the close of 1889, the assets of the Institute were valued at \$1,222,558, clear of all indebtedness; number of volumes in the library, 48,153; number of members, 3557—showing during the past ten years a gain in property of \$1,017,589; in books, of 21,127 volumes; and in membership, 1790. So much for the management of the present board.

It is beyond a question that the present library quarters are wholly inadequate, and the board has under consideration the feasibility of erecting a library building on a portion of the pavilion block, anticiating the remaining land will produce a revenue sufficient to pay the principal, interest, taxes and insurance, and have the library unincumbered at the expiration of say 17 years.

Fairs will be held in the present pavilion as long as the trustees find the premises adequate

and suitable for the purpose, and no action has been taken, nor is there any intention of moving the pavilion from its present site.

The chess and reading rooms occupy, with the exception of the small rooms filled with books, the entire upper floor of the Institute. There can be no enlarged accommodations until new quarters are secured; hence the necessity of a new library.

On account of the large number of applications to the evening classes, more room was required than the library building could afford, and they were therefore removed to the art gallery of the pavilion, where all needed accommodation was secured.

The above is a statement of facts and the official action of the trustees as recorded.

The trustees-elect will be installed at the annual meeting on Saturday evening of next week. The contested election has had the effect of interesting most of the members in the business affairs of the Institute, which should result in the general welfare of the institution.

Their victory in so sharply a contested election is a strong endorsement of the old management, under which the Institute has enjoyed a large amount of prosperity and financial success.

Finishing Stone.

The more common kinds of finish applied to stone are shown in the accompanying engraving, which are drawn from samples in the Smithsonian Institute. (See page 145.)

Rock Face Finish.—This is the natural face of the rock as broken from the quarry, or but slightly trimmed down by the pitting-tool. As in this and all the figures given, it is frequently surrounded by a margin of dove work.

Pointed Face.—In this finish the natural face of the rock has been trimmed down by means of the sharp-pointed tool called a point. It is used principally for exterior work, as in the walls of a building. Two common styles of pointing are shown.

Ax-Hammered Face.—This finish is produced by striking upon the surface repeated blows with a sharp-faced hammer, called an ax or pean hammer. It closely resembles the next, but is coarser. Used in steps, house-trimmings and other exterior work.

Patent Hammered.—This finish is produced by striking repeated blows upon the smooth surface of the rock with the rough-faced implement called a patent hammer. Five grades of fineness are commonly recognized, the 4-cut, 6-cut, 8-cut, 10-cut and 12-cut surfaces, made by hammers composed of four, six, eight, ten and 12 plates, respectively. A very common finish for the finer kinds of exterior work.

Bush Hammered.—This finish resembles closely the tooth chiseled or very fine pointing. It is used mostly on soft stone.

Square Drove.—The square drove surface is made with a wide steel chisel with a smooth edge, called a drove. It is quite common to see this style of finish as a border to the rock-face or pointed surfaces in many kinds of exterior work.

Tooth Chiseled.—This finish is produced by means of a wide steel chisel with an edge toothed like that of a saw. This and the square drove are used principally upon limestones, marbles and sandstones, the granites being too hard to be cut in this manner.

Saved Face.—This is the surface of the rock as left by the saw; the saw used for the purpose being a thin, smooth blade of soft iron, fed with sharp sand or chilled iron. This and the following styles, although possessing distinctive characteristics easily recognizable by the eye, are of such a nature that their likenesses cannot be well reproduced on paper. Hence, no attempt at illustration has been made.

Fine Sand Finish.—To produce this finish, the chiseled or sawn surface of the marble is rubbed smooth by means of a block of stone and fine wet sand or on the machines yet to be described.

Pumice Finish.—This is a very smooth but unpolished surface produced by smooth rubbing with pumice or Scotch hone.

Polished Surface.—Two kinds of polished surfaces are made—the acid gloss and the putty gloss. For either, the surface of the stone is made as smooth as possible by means of sand, or emery, and pumice, or hone, after which it is rubbed with moist woolen cloth and oxalic acid, or polishing putty. Frequently the two methods are combined, especially in tombstone work.

The Walnut Grove Dam.

Its Breakage Resulted in Great Loss of Life.

On Saturday morning last the large storage dam built across the Hassayampa creek, Arizona, by the Walnut Grove Water Storage Co., gave way under the pressure of a flood, and the water swept everything before it for miles, drowning about 100 persons. The service dam of the company, located 15 miles below the reservoir, and 15 miles of flume just approaching completion, were also swept away. Altogether the company has spent over \$800,000 on the enterprise of storing water for hydraulic mining, and the machinery had arrived, and they expected to commence operations next week. The dam which held the waters back was 110 feet long at the base and 400 feet at the top. It was 110 feet thick at the base and 10 feet at the top, forming a lake three miles in length by three-fourths of a mile wide and 110 feet deep.

The main dam was about 35 miles south of Prescott, at an elevation of 3500 feet above sea level. The drainage area of the dam is 390 miles, with a supposed annual rainfall of 16 inches. The dam was built to store water principally for some alleged rich placers on the mesa, 18 miles below the dam. Cattle raising and irrigation were also secondary considerations.

Of the 42 workmen at the dam, 39 lost their lives. It was 2 A. M. when the dam broke and the water passed on down with wonderful rapidity, overwhelming ranchers and miners on its course. Some of the bodies were found 30 miles below the point where the flood overtook them. Among those lost are a number of women and children who were living in the cabins.

It seems now, from the testimony of engineers, that this dreadful accident was due to criminal carelessness in the construction of the dam, and that the company had been informed more than a year ago that the structure was unsafe through faulty construction. Loose rock was put in below the dam to strengthen it after it was built. Mr. Luther Wagoner, C. E., of this city found on examination that with 70 feet of water above bedrock the dam leaked 141 inches of water. This was more than a year ago. This alone was enough to condemn the work. Mr. Wagoner says: "Lahor was quite unreliable, perhaps owing to the presence of saloons and gambling-places and the totally inadequate provisions made for the comfort of the men by either the company or the contractors. This, coupled with the intense heat and poor water and food, did not offer sufficient inducements to attract a sober and reliable class of workmen, a point too often overlooked in the construction of a large work."

Mr. Wagoner, who is a member of the Technical Society of the Pacific Coast, read before that society in October, 1888, a paper descriptive of this dam. Before that he had been called in by the company to devise some means to improve the dam, which was leaking badly. He discovered many traces of slovenly work. He found that the filling with loose rock had been carelessly done, while the worst blunder was the failure to carefully protect with Portland cement the place of joining the inside sheath of wood to the bedrock. He warned the company at the time that disaster would be apt to follow unless there was a radical change of method, but nothing was done. Part of the responsibility of this slovenly work lies with the corporation, which wished to economize on materials, as the freight rates were double the original price of cement and other supplies. The contract for the dam proper was for 46,000 cubic yards lumped at \$2.40 a cubic yard. The skin and cementing was extra. Lumber cost about \$15 delivered at the dam, and was out at an elevation of from 6000 to 8000 feet, on the Bradshaw mountains, and was of a very poor and knotty quality. On \$1000 worth of cement \$2000 freightage was paid.

In the paper before the Technical Society above alluded to, Mr. Wagoner said:

"The country rock at the dam-site is a coarse-grained granite easily quarried. The high price of good lumber, cement and supplies determined the choice of methods of construction."

"The history of the construction of this dam is one full of blunders, mainly caused by the officers of the company in New York. Work was commenced on company account by Prof. W. P. Blake, who carried a wall across the canyon to bedrock through about 20 feet of sand and gravel. What his intentions were to do next is not known, as no records were made

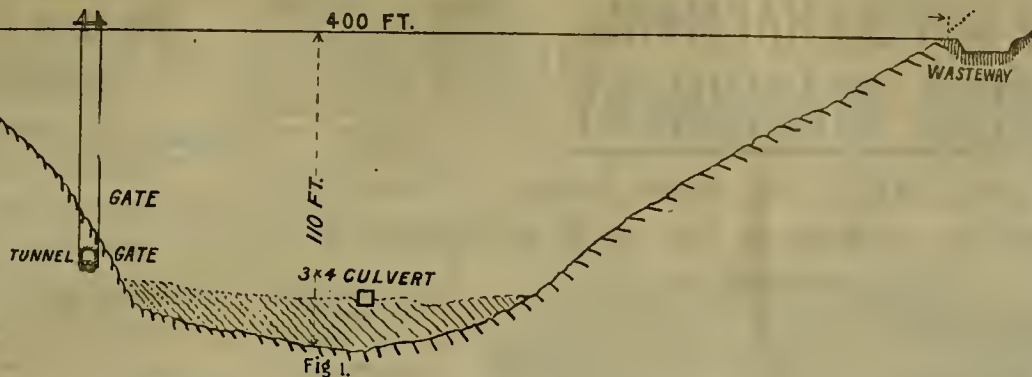


Fig. 1. PROFILE OF THE WALNUT GROVE DAM, ARIZONA TER.

or kept by the company's officers at the dam. He was succeeded by Col. E. N. Robinson as chief engineer, and the work was contracted for by Nagle & Leonard of San Francisco. I presume the cross-sections and general methods of construction were fixed by Mr. R. Under him the dam was commenced in the rear of the Blake wall, and was described in the specifications as being composed of front and back walls 14 feet at the base and 4 feet at the top, with loose rock filling between (see Fig. 2). The dam to be made water-tight by a wooden skin or sheathing.

"Quarries were opened by the contractors upon both banks of the stream above the top of dam. "Coyote" holes from 8 to 15 feet deep were charged with low-grade powder (4" nitroglycerine), and the stone dislodged in large amount. These holes usually followed the intersection of two fissures at an acute angle; sometimes a third fissure would cross the others, thus forming a triangular hole and making it easy to remove by splitting the small triangle of rock. The stone was loaded upon cars, having the bed inclined at about 15°, and were lowered over the dam by a haul-wheel and brake, a three-rail road being laid on trestle across the dam, high from 10 to 15 feet. On the slope midway was a turnout so as to allow the loaded car to pass the empty car. The loaded car was unhooked on the level and run out and dumped and returned above by the next loaded car. The logs of the trestle were left in the wall, only the caps and stringers were raised. During the first stages of construction derricks were used to distribute the larger stones; later, the center was kept high and the stones for the wall were moved by bare. The effect of this upon the stability of the dam is had because it tends to form curved beds whose slope makes an acute angle with the direction of the resultant pressure.

"The company purchased a sawmill and out the lumber for the dam, buildings, etc., and the skin was put on by contract. Cedar logs 8 to 10 inches in diameter, by 6 feet long, were huilt into the wall on the upper face, and projected out one foot. Vertical stringers 6"x10", of native pine, were bolted to the logs; the stringers were about 4 feet apart; at the joints of the 6x10 stringers a cedar log was huilt in the wall about two inches above the top of the stringers, and two 4x10 splice pieces bolted through the log and spiked to the 6x10 pieces with galvanic bolt spikes completed the joint. Upon the main wall of the dam a double planking of three-inch boards was laid, having a tarred paper put on with tacks between the planks. The outer row of planks was oiled with oakum and painted with a heavy coat of paraffine paint. The junction of the plank skin and bedrock was secured by Portland cement. Through the dam is a culvert, 3x4

feet inside, about the level of the old creek channel. This is boarded with three-inch plank inside, and has a gate to draw off the water and waste it. (See Fig. 1) The water for use is taken into an inlet tower. (See valve tower, Fig. 2) This tower is built of 8x8-inch timber, eight feet long, notched one-half on each end, secured by a five-eighths rod through each corner, the joints oiled with oakum and the outside painted with paraffine paint.

"There are two inlet valves, one at the base of the tower and one 20 feet higher. The valves are of wood, sliding upon wood; area pressed upon, about 15 square feet; a six-inch square wooden stem runs up on the outside of the tower and above the platform on the tower

were designed by an engineer and must work." From the valve tower the water is conveyed in two 20-inch iron pipes to the gate-house below the dam, where each pipe is provided with a gate. The pipes go through a tunnel, part of the way through a spur, and of rubble, arched the remainder of the way. With 70 feet of water above bedrock, the dam leaked 141 inches. (1.6 cu. ft. = 1 inch.) Various theories were advanced for the cause of the leak. One was, that settlement of the dam had forced an opening of the junction of the inclined and horizontal skins; and another was, that it leaked all over the whole surface. The extreme right-hand skin below the bed of the stream (Fig. 2) is made of but one plank. The

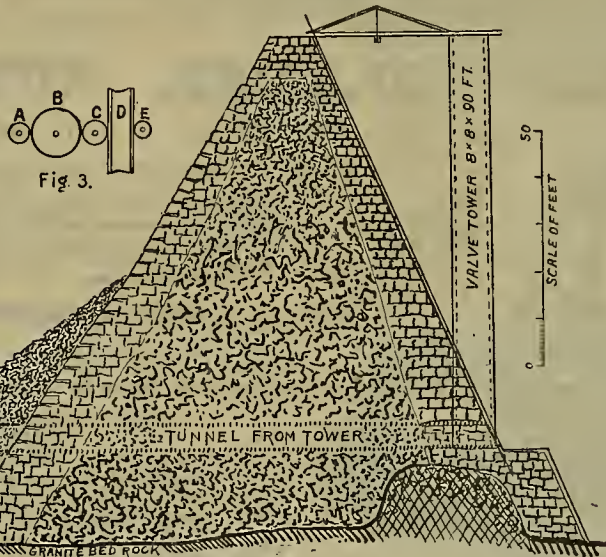


FIG. 2-CROSS-SECTION THROUGH THE DAM.

where the mechanism is placed to open and close the valves. All this gear is mounted upon a massive iron bed-plate, resting upon a wooden frame upon the platform. On both ends of the shaft is a crank. Two men could give a pull on the valve-stem of about 700 pounds with the above described gear. With 30 feet of water pressure they could not move the valve, perhaps for the reason that the load to overcome was about 11,232 pounds. The machlues (three of them) were designed by one of my predecessors, and were erected despite of my advice that they would not work. The reason assigned for erecting them was, "they

machinery for draining the water was inadequate, and the men who did the cementing to bedrock assured me that they worked in four feet of water, and that they did not go to bedrock, while per contra the sub-contractor (Whoop'em up, Jack) for this work assured me it was well done. The probable cause of leakage, I believe, is all three of the reasons named.

"Regarding the stability of the tower, I think the pressure too great upon the timbers 8"x8"x8' to be safe, and of the dam as originally built during a month's interval, when there was no chief engineer, some very bad

work was done (see Fig. 2) left side of wall, near middle. I advised the company to cut a large wasteway and put the loose rock below the dam to strengthen this weak place."

It must be remembered that these statements were presented by an engineer to an engineering society in October, 1888. Another civil engineer, Mr. John M. Currier, says:

"Colonel Robinson was always careful and painstaking, insisting upon good work being done. In cementing the front or Blake wall a small dam was built, then pumped dry, so that the men did not work in four feet of water. The work was done by the company under Colonel Robinson's direction and personal supervision. It was a good piece of work when finished. He then ordered a coffer-dam sunk in the rear of the Blake well to bedrock. Thus a solid wall 18 feet wide was built as a foundation for his front wall, completely ignoring the Blake wall, which causes the ciff set about 25 feet from bedrock and near the original bed of the river.

"The great trouble was that skilled diplomats were required on that work instead of skilled workmen. Shortly after Colonel Robinson left, I severed my connection with the work, it being impossible to exact good work, and it was of more importance to flat bonds and sell stock on Wall street, New York, than to construct a substantial dam, as I was quietly given to understand by Major Dike, a friend of Will H. Bates, the resident director, with large blocks of stock.

"About May, 1887, the work became so disagreeable I quietly determined to leave. At this time I was superintendent of construction, appointed by the contractor and approved by the Board of Directors in New York. I had reason to believe the lower wall was hulging, and a line was placed in such a manner as to determine the fact, and it did establish that fact.

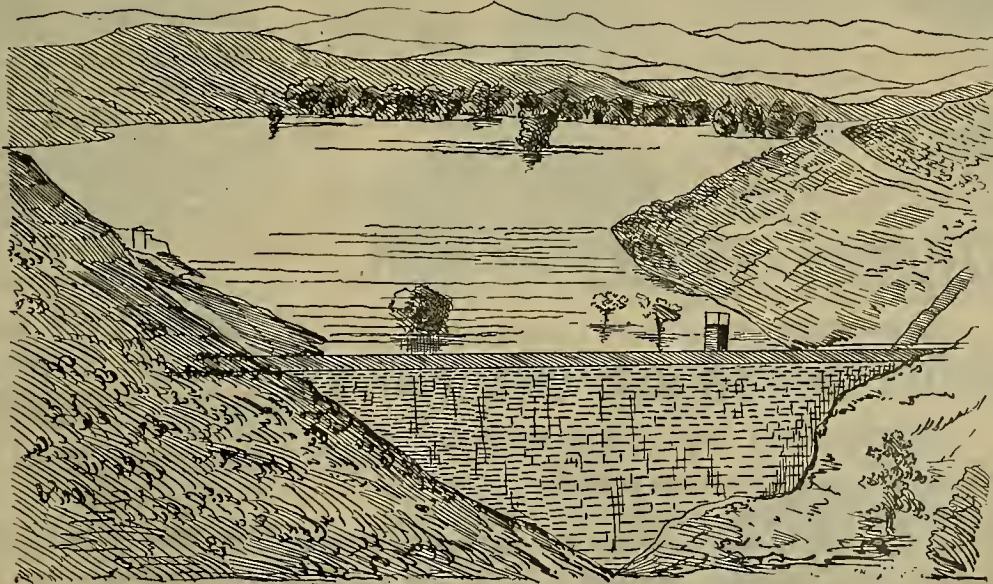
"I will state that the dam, as completed, was not according to Colonel Robinson's plans, having been changed after he left the work. His plans for wasteways were not carried out by any means, and had he been properly sustained by the company and allowed to construct the dam according to his plans, it would have been a standing monument to his memory for ages to come. The base was about 130 feet at bedrock, while the Bowman dam in California has about the same base for 100 feet in height, constructed upon almost the same plan, but little proper waste facilities. It has stood for more than 20 years—of course care being taken to prevent an overflow by providing wasteways away from the structure, and constant watching by competent and reliable men."

From the testimony thus far available, it seems that there was more speculation in stock than honest work in building a good dam. The rich placers were by no means as rich as represented. The company was told by competent men that the dam was not substantial. Those engineers who honestly tried to have good work performed were only kept a short time and left in disgust. Both Col. Robinson and Mr. Wagoner successively tried to have defects remedied, and when the company ignored their advice, they quit the work. This was also probably the case with Prof. Blake; and Mr. Currier says it was his position. The company was stocked way up into the millions, but they did not spend money enough on the engineering feature. We have dozens of these big storage-dams in California, built by competent men, and they have stood for years. But they were built of eatable material in a proper manner, and are cared for. If storage reservoirs are to be built all over the country in the improvement of arid lands, it behooves people who live and have property below such dams to have an eye on the men who inaugurate and have charge of the work of construction.

No investigation has yet been made, though latest reports would indicate that the water overflowed the dam, cut out its foot, and destroyed it, the wasteway not being sufficiently large.

More Favorable Legislation for Silver.

The Senate Finance Committee's Silver bill is short but to the point. While admitting the latter, yet we must say that it does not go far enough, for there should be embraced a section calling for free coinage at some time in the future, or, failing in this, then silver and gold should be placed on the same footing. If there is not to be free coinage for silver, then there should not be for gold. If there is to be a certain sum expended monthly in the purchase of silver, the same limitation should also be applied to the purchasing of gold. What is sauce for the goose is sauce for the gander. This has been the position of the MINING AND SCIENTIFIC PRESS from the discussion of the silver question, and this paper was among the first to take strong grounds in favor of remonetizing silver. In support of our position we published a strong array of facts and figures, the most of which have been used with good effect by others at the East. One of the most telling speeches upon the subject, and which we enlarged on in one of our bimetal articles, is that of Senator Mitchell of Oregon, delivered lately in the United States Senate. He takes strong grounds that other interests heedless that of mining are endangered by further legislation against silver, one of which is that of farming; and as this industry is the fountain of prosperity, he demanded for the farmers the remonetizing of silver.



VIEW OF THE WALNUT GROVE DAM AND LAKE.

AMALGAMATING MACHINERY.

Stamp Mills for Wet or Dry Crushing. Huntington Centrifugal Quartz Mill. Drying Cylinders. Amalgamating Pans, Settlers, Agitators and Concentrators. Retorts, Bulbion and Ingot Moulds, Conveyors, Elevators, Bruckners and Howell's Improved White's Roasting Furnaces, Etc.

FRASER & CHALMERS, MINING MACHINERY

CONCENTRATING MACHINERY.

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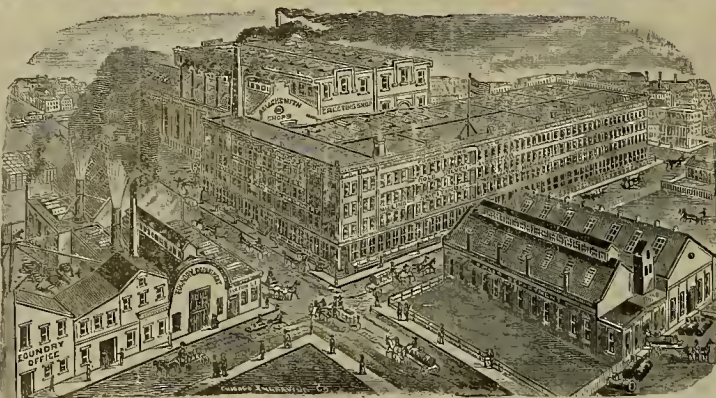
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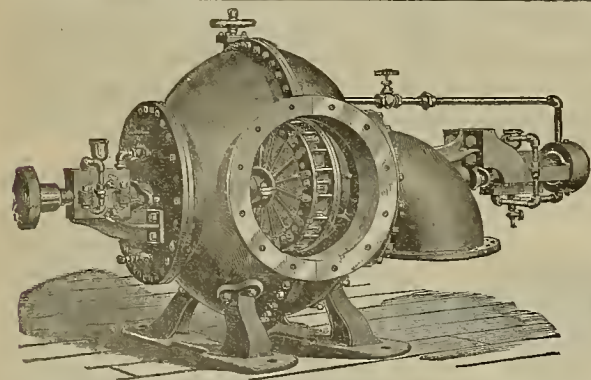
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This Resolvent IS NOT AN EXPERIMENT but a FACT, and it will do the work claimed for it at a LESS EXPENSE than any other boiler purge, AND IN NO MANNER INJURE THE IRON.

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No water in the United States produces scale in greater quantity or of a harder nature than the Monongahela River, containing SULPHATE and CARBONATE of lime, iron, MAGNESIA, SILICATE, SULPHUR, ALUMINUM, etc. The following well-known manufacturers, who are large steam users IN PITTSBURGH, and using the water from said river as boiler-feed for all their boilers, USE THIS RESOLVENT in their steam plant, and to whom reference is hereby made: Carnegie Brothers & Co., Proprietors of the Edgar Thomson Steel Works; Dilworth, Porter & Co.'s Spike Works; and Oliver and Robert's Wire Co.; and many other firms in the great manufacturing center WHERE THE RESOLVENT IS MADE. Reference is also given to Robert McMahon, Boiler Inspector for Alleghany Co., Penn., and to the following Railway Companies who use it on their locomotives: Kansas City, Fort Scott & Gulf Railroad; Central Iowa; Mexican Central; Delaware, Lackawanna & Western; Burlington, Cedar Rapids & Northern; Terre Haute & Indianapolis; Mexican National; and Denver & Rio Grande Western.

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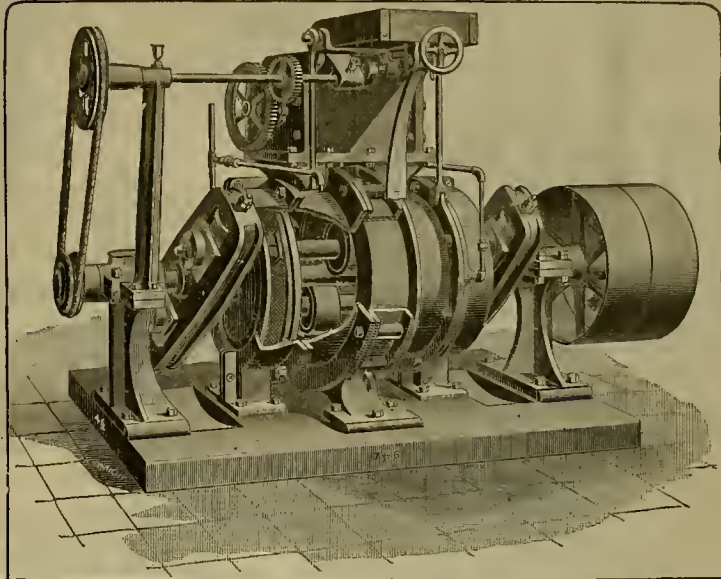
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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, Feb. 27, 1890.

General trade is again on the increase, called into life by clear skies and early prospects, without rains to the interim, of good roads. Machine-shops, iron foundries and other manufactories begin to show more activity. Several report more orders on hand, with a larger number in abeyance than at this time in 1889. The large supply of water in the mountain ranges will give renewed life to mining industry, while the bridges and other improvements in various parts of the State destroyed by high water will call for more ironwork in their reconstruction. The present outlook was never before so promising for a year of general prosperity.

In the money market our advices from all leading centers in this State are of the same tenor as prevail in this city, viz.: growing ease and less fear entertained by capitalists of losses, if they put out their funds. With confidence, money always becomes easy.

MEXICAN DOLLARS—The market has continued dull but fairly steady at from 75¢ to 76¢ cts.

SILVER—The market continues strong throughout the week at the decline reported in our last issue, with, at the close, a hardening tendency. The action of the Congressional Committee, having the silver bill in charge, in reporting a compromise bill placing silver and gold on the same footing, has no doubt done much in promoting a more healthy market for silver. It now looks as if silver legislation will be among the first. When the Committee bill comes up for debate, then a far better idea can be formed of what to expect from the present Congress. Exporters are still out of the market, but notwithstanding this, the Mint has considerable difficulty in getting silver, even by paying an advance on the Eastern and European parity.

Silver in this market has been kept steady at 95½ cents under mint purchases, although at the close other buyers are more bullish, owing to London cables coming through to-day at 44d, and New York at 95½ cents. The local mint bought since last Thursday 166,000 ounces at 95½ cents.

QUICKSILVER—Receipts the past week aggregate 227 flasks, and exports by sea 137 flasks. Those in position to know are confident of a very large home consumption, much larger than for several years past.

ANTIMONY—The supply continues light. Reliable advices report that the old sources of supply, particularly Japan and Borneo, are being exhausted. This naturally will cause high prices until new districts are developed.

BORAX—Receipts the past week were nil. The exports by sea were as follows: To Victoria, B. C., 100 lbs.; New York, 559,426 lbs.; and Guaymas, 1092 lbs. The market is very firm under a continued strong market at the East.

LIME—Receipts the past week aggregate 2833 bbls., and exports by sea, 450 bbls. to Honolulu. The home consumptive demand is steadily increasing, notwithstanding interferences by storms.

LEAD—The market is fairly firm. The inquiry is reported to be increasing. At the East, our mail advices indicate the market favorable to a large increased consumption.

COPPER—The market is essentially unchanged. Owing to interruptions to the mails by snowstorms, we are not in receipt of our usually late advices regarding the Eastern and European markets, but the latest received indicated a strong tone, and the outlook favorable to a higher range of values under a good demand.

IRON—We have added another brand to our list. The market is unchanged. Importers, as far as we can learn, are more hopeful of a free consumptive demand, which, if realized, would soon absorb outside supplies and force foundrymen and others in the market as buyers, that is, instead of holders looking up buyers, the latter would have to look up sellers.

TIN—Both spot and to arrive are dull and in buyers' favor. Consumers are well supplied, and until they see further ahead they are only tempted by concessions to anticipate any probable wants.

COAL—Imports the past week aggregate as follows: From Departure Bay, 5750 tons; Tacoma, 6432; Newcastle, N. S. W., 4886; Seattle, 7470; Coos Bay, 1960; New York, 76; Overland, 20. Total, 26,534 tons. The large receipts of Coast are against any advance, while an easier tone to the Australian freight is favorable to later on shipments from there. A new brand of Wellington coal has been put on the market, and so far as we can learn, gives good satisfaction. Cold weather and clear skies have stimulated the consumption of all kinds, but this has no effect on prices, and is not likely to unless there is a strike or else a serious accident in one or more of the leading coal mines. With longer days, the gas companies consume less coal, but then this is more than offset by a large increase to the consumption of steam coal.

Eastern Metal Markets.

By Telegraph.

NEW YORK, Feb. 26, 1890.—The following are the closing prices the past week:

	Silver In.	Silver Out.	Copper.	Lead.	Tin.
Thursday.....	43 3/4	85 1/2	114 50	3 80	\$20 40
Friday.....	43 3/4	85 1/2	114 50	3 80 1/2	20 55
Saturday.....	43 3/4	85 1/2	114 50	3 80	20 65
Sunday.....	43 3/4	85 1/2	114 50	3 80	20 70
Monday.....	43 3/4	85 1/2	114 50	3 80 1/2	20 65
Tuesday.....	43 3/4	85 1/2	114 50	3 80	20 70
Wednesday.....	43 3/4	85 1/2	114 50	3 80 1/2	20 65

Borax—Light supply; very firm at 9¢ to 9½¢ for California refined. Copper is quiet; 14½¢ bid for Lake here, and Philadelphia, which is below mining companies' views (sales are made higher). Wire bars, 14½¢ to 14¾¢; casting bars, 12½¢. Pig lead, nominally, at \$3.82½ to \$3.87½.

DROPPED FROM THE LIST—The following mining companies have been dropped from the list of the San Francisco Stock Board for the non-payment of the annual dues: Phil Sheri dao, Trofin, North Bonanza, Mt. Cory, E.ko Con., Paradise Valley, Lapanta, Navajo Queen, Goodshaw and Booker.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, February 27, 1890.

ANTIMONY.....	25 1/2 @	—
BORAX—Refined, in carload lots.....	7 1/2 @	—
Powdered.....	7 1/2 @	—
Concentrated.....	5 1/2 @	—
All grades jobbing at an advance.....	—	—
COPPER.....	—	—
Bolt.....	23 1/2 @	25
Sheeting.....	23 1/2 @	25
Ingot, jobbing.....	17 1/2 @	18
do, wholesale.....	15 1/2 @	16
Fire Box Sheet.....	23 1/2 @	25
LEAD—Pig.....	4 1/2 @	—
Bar.....	5 1/2 @	—
Sheet.....	5 1/2 @	—
Pipe.....	5 1/2 @	—
Shot, discount 10% on 500 lbs Drop, ½ bag.....	1 45 @	—
Buck, ½ bag.....	1 55 @	—
Chilled, do.....	1 85 @	—
TINPLATE—B. V., steel grade, 14x20, to arrive.....	4 80 @	4 85
B. V., steel grade, 14x20, spot.....	4 70 @	4 75
Charcoal, 14x20.....	5 75 @	—
do roofing, 14x20.....	5 00 @	—
do, 20x28.....	12 00 @	—
Pig tin, spot, ½ lb.....	13 50 @	14 00
Coke, Eng. ton, spot, in bulk.....	13 50 @	14 00
do, do, to load.....	14 50 @	15 00
QUICKSILVER—By the flask.....	50 00 @	—
Flask, new.....	35 00 @	—
Flask, old.....	35 00 @	—
CHROME IRON ORE.....	10 00 @	—
IRON—Bar, base.....	3 1/2 @	3 3/4
Norway, base.....	4 1/2 @	4 1/2
IRON—Glenagrock ton.....	35 00 @	—
Eginton, ton.....	35 00 @	—
American Soft, No. 1, ton.....	235 00 @	—
Oregon Pig, ton.....	235 00 @	—
Pig, Sound.....	35 00 @	—
Clay Lane White.....	27 00 @	—
Shot, No. 1.....	35 00 @	35 00
Bar Iron (base price) ½ lb.....	—	—
Langsloe.....	35 00 @	—
Thorncliffe.....	35 00 @	—
Garthorpe.....	35 00 @	—
Barrow.....	35 00 @	—

Coal.

	Per Ton.	Per Ton.
Australian.....	7 50 @	7 75
Liverpool S/W.....	8 50 @	8 75
Scotch Splint.....	9 00 @	9 00
Cardiff.....	9 50 @	10 00
SPOT FROM YARD.....	—	—
Wellington.....	9 00 @	9 00
Greta.....	8 00 @	8 00
Westminster Brynbo.....	8 50 @	8 50
Nansaimo.....	9 00 @	9 00
Sydney.....	8 00 @	8 00
Gilman.....	7 00 @	7 00

Mining Share Market.

The mining share market the past week exhibited a fair degree of activity in the Comstocks and Tuscaroras, with an attempt made to galvanize the Bodies into life. The Comstocks declined on last Friday and Saturday, but on Monday, under a sudden jump in Crown Point, there was more strength, which was soon exhausted only to be revived by an upheaval in Con. Imperial, with more activity in Yellow Jacket. This was also short-lived. After each shading off, Ophir, Mexican and other North End stocks went to still lower figures. The presiding genius of the stock department of an evening paper claims the credit of Springing on the underfired public enough bear information to cause even a confirmed "bull" to attempt the feat of diving down so as to get to the bottom and keep it from dropping out. The condition of most of the Comstock mines, even on present showing, warrants higher prices for the stock than some command, while others, again, sell too high. This is probably due to the latter being better concentrated and not producing bullion, causing them to be a better gamble as exploring work goes on. On merit, upon present showing, Crown Point, Hale and Norcross, Overman, Chollar and Savage ought to do better; while the improvement in Con. Imperial, Yellow Jacket, Seg. Belcher, Alpha and Exchequer and one or two others deserves greater attention if not higher prices.

During the past week the outside public sold more stocks than they bought. This they did under well-circulated bear points by those who have proven correct for some time past. The selling has also been assisted by authentic reports of assessments to be levied soon, and also by reports that the financial standing of the mines, to be made public on next Monday, will be very bad. It is asserted that Belcher, Potosi, Challenge, Confidence, Alpha, Ophir, Union, and two other mining companies on the Comstock, will levy assessments next month; while of the outside companies the following will levy assessments: Bodie, Mono, Peer, Del Monte and two others of the Tuscaroras. After the assessments on the shares of the Comstock and outside mines are levied, it is claimed that the stock market will do better, although when first levied there might be a sharp decline. These reports are given for what they are worth, but it is only proper to say that they are more often right than wrong, yet how they will prove now, time can only tell. The manipulators give their tools correct information on a market so as to handle or fleece the public to a better advantage when the time arrives.

From the mines, private advices continue hard to get, which is construed by the better informed to warrant the assertion that the work going on in the leading mines is of a far more important character than the managers wish the public to know. A report is current of an improvement in Con. Imperial. This strike, about 10 feet of ore, was made three or four weeks ago. In the same mine a 5-foot body of ore is reported to have been run into near the Confidence level.

Official advices report that last week in Crown Point in the west crosscut on the 160-foot level, they ran into a narrow streak of ore assaying from \$40 to \$60 a ton. This may lead to something still better. In Crocker an improvement is reported in the west crosscut on both the 500 and 600-foot levels. In Hale & Norcross the improvement noted in this paper is confirmed. Yellow Jacket, Confidence, Challenge, Belcher and Overman deserve close watching.

The work going on in and around the Ward Shaft is of the most important character, and may, sooner than expected, surprise the many. From the North end mines our advices are very meager, yet well-informed, practical miners are very hopeful of the best results in one or more of them. The poor, unsatisfactory advices from the mines confirm the opinion of the better informed that the pool is

MINING SHAREHOLDERS' DIRECTORY.

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ASSESSMENTS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Adelaide Copper M Co	Nevada.	1.	1.	Dec 31.	Feb 17.	Mar 17.	W H Graves. 426 Sausome St.
Baltimore M Co	Nevada.	1.	20.	Jan 17.	Feb 17.	Mar 17.	A K Grimes. 402 Montgomery St.
Belcher Cons M Co	California.	11.	10.	Feb 10.	Mar 17.	Apr 13.	C O Harvey. 303 California St.
Butte King M Co.	California.	1.	30.	Feb 13.	Mar 20.	Apr 12.	W C Lewis. 723 Market St.
Camp Creek M & M Co.	California.	1.	2.	Dec 30.	Feb 12.	Mar 10.	A S Folger. 213 Fremont St.
Con St Gothard M Co.	California.	1.	5.	Jan 14.	Feb 17.	Mar 10.	T Wetzel. 522 Montgomery St.
Crocker M Co.	Arizona.	8.	10.	Jan 20.	Mar 6.	Mar 28.	N T Messer. 309 Montgomery St.
East Bay & Belcher M Co.	Nevada.	1.	25.	Feb 11.	Mar 14.	Mar 31.	C H Massey. 301 Montgomery St.
Exchequer M Co.	California.	28.	3.	Feb 24.	Apr 5.	Apr 21.	W H Rahe. 224 Montgomery St.
Exchequer M Co.	Nevada.	28.	25.	Dec 16.	Feb 10.	Mar 3.	O E Elliott. 309 Montgomery St.
Grant Prize M Co.	Nevada.	24.	30.	Jan 27.	Mar 6.	Mar 25.	R R Grayson. 327 Pine St.
Gray Eagle M Co.	California.	15.	4.	Jan 21.	Feb 25.	Mar 17.	M H Burdington. 303 California St.
Happy Valley Bl. Gravel Co.	California.	6.	5.	Feb 12.	Mar 24.	Apr 14.	D M Keot. 330 Pine St.
Martio White M Co.	Nevada.	23.	25.	Feb 12.	Mar 31.	Apr 30.	A B Cooper. 325 Montgomery St.
Mineral King M & M Co.	Arizona.	4.	10.	Jan 10.	Feb 10.	Mar 3.	P H Leuchar. 419 California St.
Occidental Cons M Co.	Nevada.	45.	25.	Jan 20.	Feb 25.	Mar 24.	A K Duobard. 309 Montgomery St.
Russell & R M Co.	California.	5.	5.	Jan 13.	Feb 17.	Mar 12.	J Morizio. 328 Montgomery St.
Silver King M Co.	Arizona.	2.	30.	Jan 15.	Feb 25.	Mar 27.	A Waterman. 309 Montgomery St.
True Cone M Co.	California.	8.	24.	Jan 18.	Feb 15.	Mar 10.	J O Bates. 434 California St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING DATE.
Alabamaf Barley and Humboldt M Co's.....	Nevada.....	W A Wilson.....	322 Montgomery St.....	Annual..... Mar 10
Bullion-Beech and Cal M Co.....	Nevada.....	A Badlam.....	322 Montgomery St.....	Annual..... Mar 19
California Iron & Steel Co.....	California.....	F Bonanza.....	438 California St.....	Annual..... Apr 21
Hale & Norcross M Co.....	Nevada.....	A B Thompson.....	309 Montgomery St.....	Annual..... Mar 15
Indio Cons L & M Co.....	California.....	S O Mills.....	217 Sansome St.....	Annual..... Mar 5
Potosi M Co.....	Nevada.....	O E Elliott.....	309 Montgomery St.....	Annual..... Mar 12

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Champion M Co.....	Nevada.....	T Wetzel.....	522 Montgomery St.....	10.....	Jan 20
Caledonia M Co.....	Nevada.....	A S Ohmenant.....	322 Montgomery St.....	25.....	Aug 5
Con California & Va M Co.....	Nevada.....	A W Havens.....	309 Montgomery St.....	08.....	Feb 10
Derbec Blue Gravel M Co.....	California.....	T Wetzel.....	522 Montgomery St.....	10.....	Dec 23
Idaho M Co.....	California.....	T Wetzel.....	522 Montgomery St.....	5 00.....	Oct 21
Mid Diablo M Co.....	Nevada.....	R H Cash.....	319 Pine St.....	30.....	Oct 22
Pacific Borax Salt & Soda Co.....	California.....	A H Clough.....	320 Montgomery St.....	1 00.....	Feb 10

gathering in stock, and to do so they will sink prices by degrees as long as they can gather them in.

From the Quijotas, official news continues good—to good for the stock, if we are to judge by the prices ruling for Crocker, Peer and Peerless. From the Tuscaroras our advices are confirmatory of another decided improvement in Del Monte. Commonwealth is turning out large quantities of bullion, which means 50-cent dividends. North Belle Isle has about 1,000 tons of concentrates that assay very high, which will soon be turned into bullion. The work going on in Grand Prize and Belle Isle is of a very interesting and important character.

From the Bodies we are without our usual information. This is probably due to there being no particular change in the mines. Official letters report more miners at work in Bodie, and that exploring and other work on the 700, 800 and 900-foot levels is being vigorously pushed.

Our last private information, part of which was given in last week's PRESS, was of a very encouraging nature, yet usually well informed parties here are afraid that the stringers, etc., report may run into an assessment rather than into ore of value.

The mining share market opened steady this morning under light business. After the 9:30 call there was more activity and higher prices in the Tuscaroras under the leadership of Del Monte, which was soon followed by a better demand for the Comstocks, causing higher prices to rule. The Bodies sold low. The advance in the Tuscaroras and Comstocks was according to street points. After to-morrow the points are for lower prices on the latter. The points out on the Tuscaroras are for quite a setback before there can be much of an upward move.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, department to, San Francisco:

NORTHERN DEVELOPMENT CO., Feb. 25. Object, hunting, trading and fishing. Capital stock, \$250,000. Directors—W. H. Ferguson, John Ross, L. W. Johnson, John Sheao and H. M. Scrivenor.

WEST SHORE LAND CORPORATION, Feb. 25. Capital stock, \$250,000. Directors—R. J. Martin, C. McCreary, Robert Mack, D. Hirschfeld, Jules Levy, S. Epstein and D. P. Belknap.

CALIFORNIA WATER CO., Feb. 25 (Oakland). Object, the furnishing of water to San Francisco, San Mateo, Alameda, Santa Clara and other counties, the water to be derived from whatsoever sources may be available to purchase or otherwise; also to secure water rights, by condemnation, to build sites, dams, dam-sites, canals, flumes, etc. Capital stock, \$50,000,000, divided into 500,000 shares. Directors—Ansel M. Easton, James Cunioigham, Albert U. Mills, Montague T. Moses and Nathaniel J. Brittan.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Justice, Feb. 24, \$4495; Con. California and Virginia, 24, \$77,025; Commonwealth, 24, \$31,000; Germania, 18, \$2580; Haouner, 18, \$3100; Germania, 19, \$2319; Hanauer, 22, \$2374; Germania, 22, \$2200.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. C. HOAG—San Francisco.
R. G. BAILEY—San Francisco.
W. W. THORNTON—Los Angeles Cal.
E. FUCHER—San Francisco.
G. WILSON—Sacramento Cal.
E. H. SCHARFF—Calaveras Co.
FRANK S. CHAPIN—Colusa.
ISAAC AYER—Fresno, Cal.
SAMUEL CLIFF—San Luis Obispo Co.
WM. H. HILLBARY—Oregon.
E. E. DUNN—Oregon.
CHAS. M. MOODY—Oregon.
H. G. FANNOVA—Washington.
R. G. HUSTON—Montana.

THE UNION IRON WORKS' FORFEIT.—The request of the Union Iron Works of San Francisco to be relieved of the penalties accruing by reason of the horse-power developed by the onrizer Charleston falling below the contract requirement, was favorably acted upon by the Senate Naval Affairs Committee. A bill will be reported relieving the company of the payment of the \$33,000 penalty, to which it would otherwise be subjected.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Feb. 5.	WEEK ENDING Feb. 13.	WEEK ENDING Feb. 20.	WEEK ENDING Feb. 27.
Alpha.....	.90.....	.95.....	1.00.....	1.10.....
Alta.....	1.25.....	1.25.....	1.10.....	1.25.....
Andes.....	.45.....	.50.....	.50.....	.45.....
Belcher.....	1.75.....	1.83.....	1.81.....	1.85.....
Beet & Belcher.....	2.40.....	2.50.....	2.80.....	3.20.....
Bodie.....	.55.....	.50.....	.55.....	.55.....
Bodie Cons.....	.42.....	.50.....	.50.....	.45.....
Bulwer.....	.20.....	.20.....	.20.....	.25.....
Commonwealth.....	3.35.....	3.53.....	3.53.....	4.00.....
Con. Va. & Cal.....	4.40.....	4.8.....	4.75.....	4.90.....
Challenge.....	.120.....	1.0.....	1.10.....	1.05.....
Chollar.....	2.40.....	2.80.....	2.75.....	2.80.....
Confidence.....	3.40.....	3.40.....	3.40.....	3.50.....
Con. Imperial.....	.30.....	.25.....	.30.....	.30.....
Caledonia.....	.20.....	.20.....	.20.....	.25.....
Crown Point.....	1.50.....	1.55.....	1.55.....	1.55.....
Crocker.....	.15.....	.20.....	.20.....	.30.....
Del Monte.....	4.00.....	2.80.....	3.25.....	2.50.....
Eureka Cons.....	40.....	50.....	50.....	55.....
Exchequer.....	60.....	55.....	50.....	55.....
Grand Prize.....	.35.....	.35.....	.40.....	.35.....
Gould & Curry.....	1.40.....	1.45.....	1.50.....	1.51.....
Hale & Norcross.....	2.80.....	3.05.....	3.00.....	2.90.....
Idaho.....	.25.....	.30.....	.30.....	.30.....
Julia.....	.25.....	.30.....	.30.....	.25.....
Justice.....	1.30.....	1.40.....	1.30.....	1.45.....
Kentucky.....	.60.....	.70.....	.55.....	.70.....
Lady Wash.....	.25.....	.25.....	.25.....	.30.....
Mono.....	.35.....	.35.....	.35.....	.30.....
Mexican.....	2.85.....	2.75.....	2.80.....	3.70.....
Navajo.....	.35.....	.30.....	.45.....	.30.....
North Belle Isle.....	.35.....	.95.....	.80.....	1.10.....
Nov. Queen.....	.65.....	.65.....	.75.....	.85.....
Occidental.....	.55.....	.50.....	.55.....	.65.....
Ophir.....	3.50.....	3.70.....	3.80.....	4.00.....
Overman.....	.55.....	1.00.....	1.01.....	1.05.....
Potosi.....	1.70.....	2.00.....	2.00.....	1.75.....
Peerless.....	.25.....	.20.....	.25.....	.25.....
Peerless.....	.25.....	.20.....	.25.....	.25.....
Sage.....	1.60.....	1.55.....	1.70.....	1.80.....
S. B. & M.....	1.40.....	1.45.....	1.60.....	1.55.....
Sierra Nevada.....	1.95.....	1.90.....	2.00.....	2.45.....
Silver Hill.....	.25.....	.25.....	.25.....	.35.....
Scott.....	.15.....	.25.....	.25.....	.25.....
Union Cons.....	2.25.....	2.35.....	2.35.....	2.80.....
Utah.....	.55.....	.60.....	.55.....	.65.....
Yellow Jacket.....	2.00.....	2.05.....	2.05.....	2.25.....

DELINQUENT SALE NOTICE.

Gray Eagle Mining Company. Location of principal place of business, San Francisco, California. Location of Works, Placer Co., Cal.

NOTICE—There are delinquent upon the following described Stock, on account of Assessment (No. 16) levied on the 21st day of January, 1890, the several amounts set opposite the names of the respective Shareholders, as follows:

NAMES.	No. Certificate.	No. Shares.	Am't.
D E Allison.....	804	25	\$1 00
D Bowers.....	379	20	80
D E Wiers.....	404	500	20 00
F W Blaney.....	284	20	80
J M Huntington, Trustee.....	503	4475	179 00
O H Bogart, Trustee.....	405	47	1 00
O H Bogart, Trustee.....	447	5000	200 00
O H Bogart, Trustee.....	470	1000	40 00
O H Bogart, Trustee.....	471	500	20 00
O H Bogart, Trustee.....	472	500	20 00
James Clark.....	401	100	4 00
H W Gray, Trustee.....	181	500	20 00
B W Haines.....	498	500	20 00
B W Haines.....	499	500	20 00
W C Hunter, Trustee.....	500	100	4 00
W C Hunter, Trustee.....	507	100	4 00
W C Hunter, Trustee.....	508	100	4 00
W C Hunter, Trustee.....	509	100	4 00
W C Hunter, Trustee.....	510	100	4 00
W C Hunter, Trustee.....	511	100	4 00
Cyrus W Jones, Trustee.....	421	1000	40 00
John Linden.....	84	100	4 00
H M Rosekrans.....	39	600	24 00
Geo Ross.....	145	100	4 00
Geo Ross.....	146	100	4 00
Geo Ross.....	147	100	4 00
Geo Ross.....	148	100	4 00
Geo Ross.....	149	100	4 00
Geo Ross.....	240	20	80
C S Stout, Trustee.....	474	2000	80 00
C S Stout, Trustee.....	477	953	38 12
Mrs M E Stout.....	170	500	20 00
Mrs M E Stout.....	184	50	2 00
W A Searles, Trustee.....	518	1000	40 00
J N Taylor.....	102	1000	40 00
J N Taylor.....	330	40	1 60
Theo Wetzel, Trustee.....	176	200	8 00
Theo Wetzel, Trustee.....	225	8	32
Theo Wetzel, Trustee.....	265	312	12 48
A H Winn, Trustee.....	406	1000	40 00
A H Winn, Trustee.....	467	500	20 00
A H Winn, Trustee.....	468	500	20 00

And in accordance with law, and an order of the Board of Directors, made on the 21st day of January, 1890, so many shares of each parcel of such Stock as may be necessary, will be sold at public Auction, at the office of the Company, Room 11, No. 303 California street, San Francisco, California, on MONDAY, THE SEVENTEENTH (17th) DAY OF MARCH, 1890, at the hour of 1 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale. J. M. BURNETT, Secretary.

Office, Room 11, No. 303 California street, San Francisco, California

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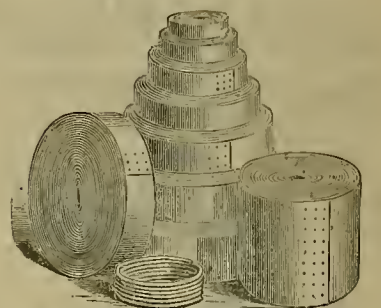
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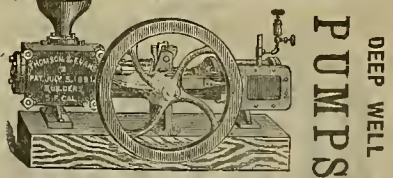
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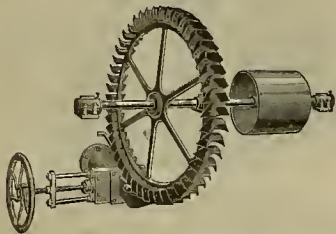
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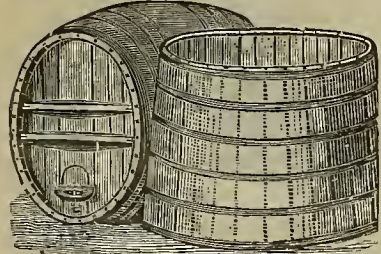
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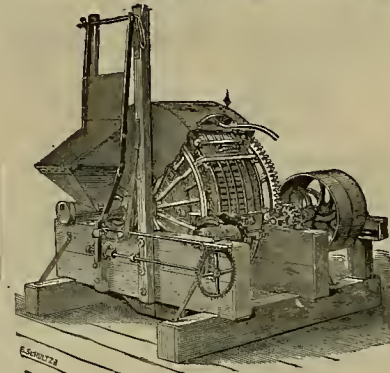
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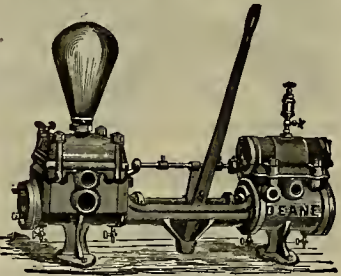
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COAL MINES OF THE WESTERN COAST.

A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

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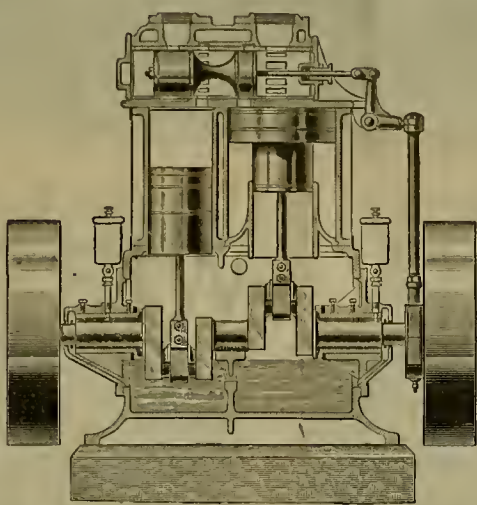
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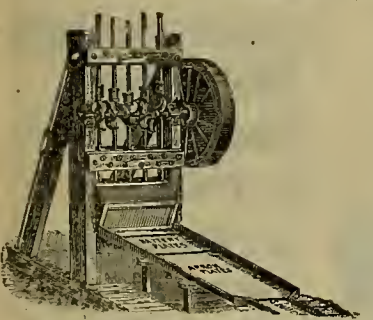
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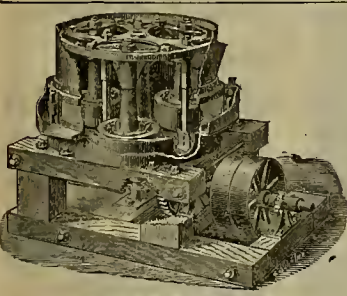


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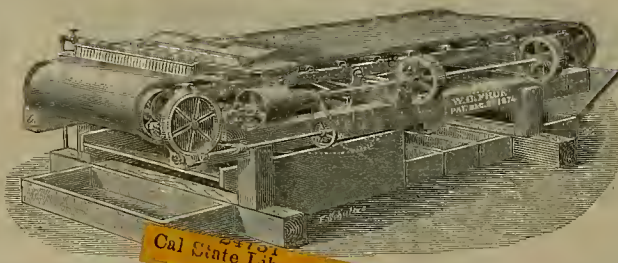


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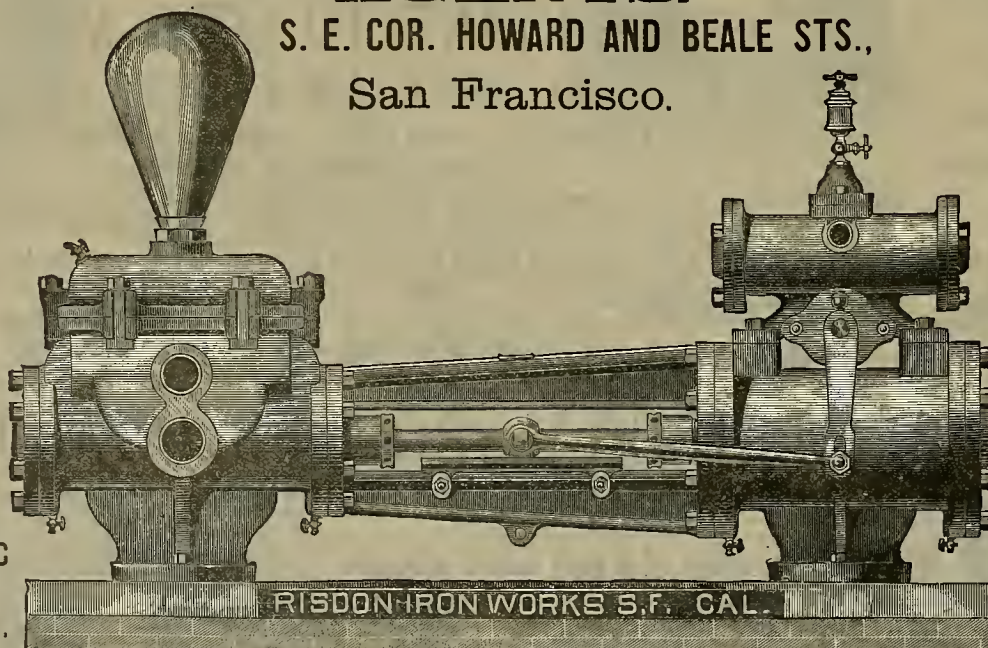
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DEWEY & CO., PUBLISHERS.

SAN FRANCISCO, SATURDAY, MARCH 8, 1890.

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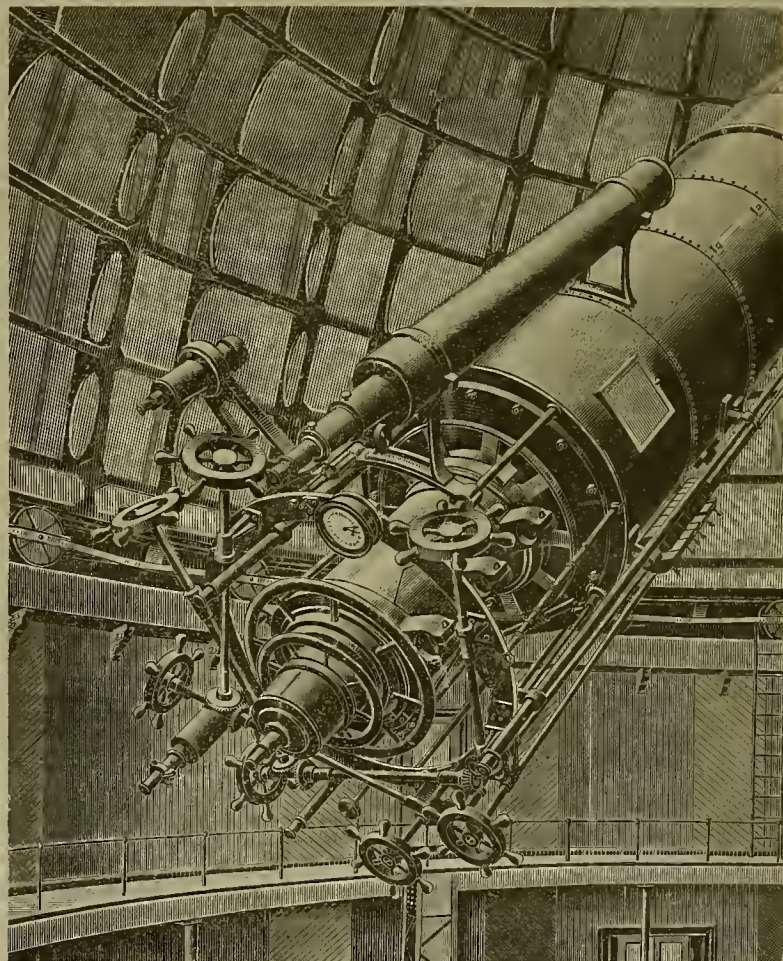


THE ROTARY STEAM SNOW SHOVEL—See page 171.

Eye End of the Lick Telescope.

One of the great objects of curiosity to those who visit California is the Lick telescope on Mount Hamilton, which, from its large size, has become famous throughout the world. The steel tube of the telescope is 56 feet long, and

the entire weight of the mounting is 65,000 pounds. The eye end of this great telescope, which is shown in the engraving, is a wondrous combination of intricate and delicate mechanism. One of the observers, notwithstanding his familiarity, says that when observing he can never get rid of the idea that he is seated



THE EYE-END OF THE GREAT LICK TELESCOPE.

in the cab of a locomotive. The eye end is fitted for use with micrometers, spectroscopes, photometers, gears for operating the mechanism, etc., which make it look entirely different from an ordinary telescope. In fact, the large "finder" mounted on top is as high as some observing telescopes. As may be imagined, no one is allowed to handle this instrument except those directly in charge.

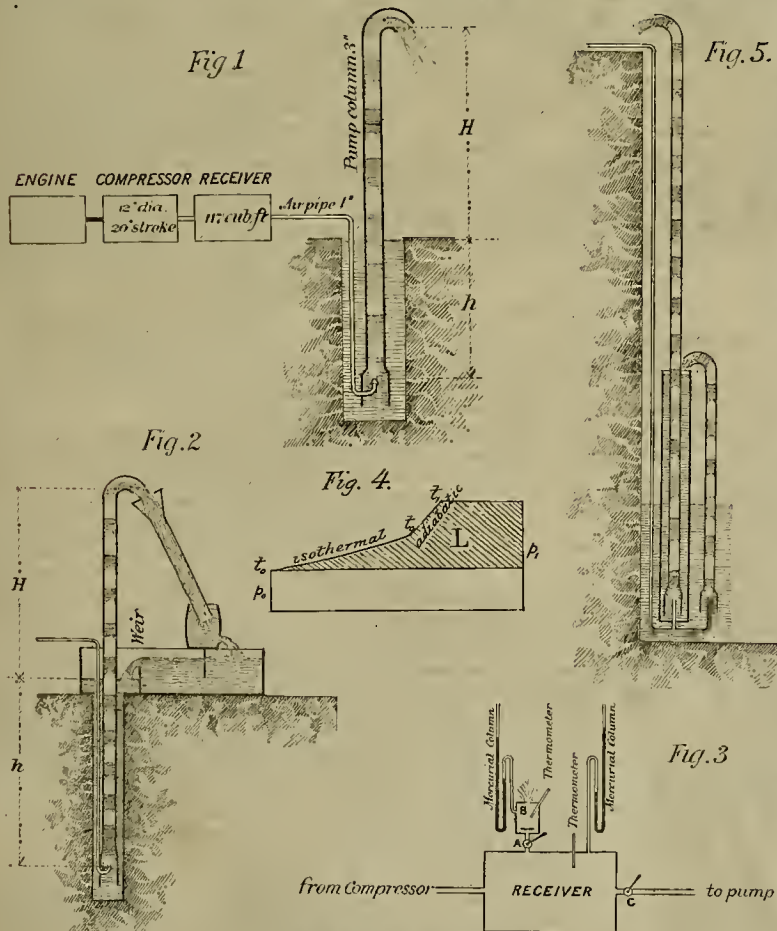
piston-like layers, and rising rapidly in the column, does the work of pumping. The water is discharged in alternate layers with the air.

The apparatus tested, was erected without due regard to heat dimensions, and it is deemed proper to state that the efficiencies found could have been increased by a few simple alterations. Pipes of different diameters were not provided, and the experimenters were able to change only the length of the pump column, the amounts of submersion and lift, and the pressure in the receiver, hence the quantity of air supplied.

The diameter of the pump column was 3 inches, of the air pipe 0.9 inch, and of the air discharge nozzle $\frac{5}{8}$ inch. The air pipe had four sharp bends, and a length of 35 feet plus the extent of the submersion. The water was pumped from a closed-pipe well (55 feet deep and 10 inches in diameter) and was discharged into a tank and delivered—over a quadrantal weir—back to the well. A long mercurial column was connected with the receiver for the purpose of obtaining accurate measurement of pressure.

Two methods of ascertaining the quantity of air delivered to the pump were adopted. By the first method, the cubic contents of the receiver was measured. The escape cocks from the receiver were closed and the compressor

(Concluded on page 168.)



POHLE'S AIR-LIFT PUMP.

Superintendents.

A Mining Trip From Yreka, Cal., to Portland, Oregon.

A perilous trip from Yreka, Cal., to Portland, Oregon, was undertaken and accomplished by A. E. Schwatka, an uncle of Lieutenant Fred Schwatka of Arctic exploration fame, during the storms which have recently prevailed in Northern California. The *Morning Oregonian*, Portland, Oregon, Feb. 13th, says: "A good story entitled 'Traveling Under Difficulties' might be written from the experiences of A. E. Schwatka (uncle of Lieutenant Fred Schwatka of Arctic exploration fame), who left Yreka, Cal., January 30th, for Portland to meet Colonel John W. Drew, manager and treasurer of the Rye Valley Mining Co. Mr. Schwatka, although well along in years, is endowed with the characteristic mountaineer hardihood and pluck, and he traveled over one-third of the way on foot. He left with Colonel Drew last evening for the mines, where he goes to assume the duties of superintendent."

"A brief account of his trip and the experiences of himself and a party with whom he fell in at Central Point, may not be uninteresting to the public."

"Mr. Schwatka left Yreka Thursday, January 30th, going by rail as far as Montague, where he arrived at 1 p. m. He then walked to Lairds, a distance of 11 miles, remaining there over night. Friday morning he set out on foot for Hornbrook, at which place he got a horse. He rode to the Lower Coles, a distance of 12 miles, then walked three miles to the Upper Coles, and again put up for the night. The snow was from two to three feet deep and walking was rather a slow mode of locomotion, but the only one available."

"Saturday, Feb. 1st, he left the Upper Coles with a guide for the mouth of the Siskiyou tunnel. Having gone through the tunnel, he took another guide, who piloted him to Delahides, three miles this way. From there he walked to Major Bannon's place, four miles farther, where he arrived at 5 o'clock in the evening. He then got a horse and buckboard and made Ashland, a distance of 17 miles, at 8 o'clock."

"In crossing the Siskiyou, he had to hire a man to break paths and trails, so that he could walk. It was snowing very hard at times, and he could not use snowshoes."

"Sunday noon, Feb. 2d, he left Ashland in a buggy and reached Central Point at 6 o'clock in the evening. Here the water was so high that he could make no further progress and he was obliged to remain until Tuesday evening, Feb. 4th."

"At Central Point, Mr. Schwatka was joined by J. W. Winn, Daniel Sternberg and J. E. Fenton."

"Tuesday evening the party took a hand-car. They had gone only about four miles when they came to a washout nearly 300 feet in length, near Yolo. The track was standing on edge and they had to abandon it. They managed to get their car over the washout, and then ran three miles farther, when their path was again blocked by a landslide. It became necessary to abandon the car, and the party walked four miles farther to Gold Hill, where all approaches to the wagon bridge were washed away. They crossed on the railway bridge, which was in good condition, and from there walked to Woodville, a distance of nine miles, where they arrived at 2 o'clock in the morning."

"Having taken a little rest at Dr. Stanley's hotel, the Rogue River House, the party resumed the journey by foot about 7 o'clock on the morning of the 5th. The 14 miles between Woodville and Grant's Pass, where they arrived at noon, were trudged in a pelting rain. Being weary and footsore, a rest of six hours was taken, and then the party proceeded by hand-car to Tunnel No. 9, a distance of 18 miles. They then walked to Leland, four miles, arriving there at 1 o'clock Thursday morning, February 6th. Here they could not obtain any kind of lodgings. Even the section boss refused them admittance into his house, and they were obliged to pass the remainder of the night in an old dilapidated car side-tracked there."

"A little after 2 o'clock in the morning a feeling of emptiness in the region of the stomach caused them to continue the weary march. After walking four miles, they reached a farm-house, where they were enabled to get something to eat."

"At this point, Sternberg was taken sick from over-exertion and exposure, but would not give up, and he insisted upon continuing the tramp after a short rest. By the assistance of his companions, he was enabled to get to Glendale, which was reached at 12 o'clock noon."

"The party remained at Glendale overnight, and the next morning, having been increased by the arrival of G. S. Miller of Oswego, who joined them, they procured saddle-horses and made Myrtle creek, 30 miles, by 7 o'clock in the evening. They remained there over night, and Saturday morning, February 8th, all started out on foot. They reached Roberts' hill, a distance of 16 miles, at 3 o'clock in the afternoon, and here found a construction train, on which they rode as far as Roseburg. Remaining there over night, they took another construction train Sunday morning, and rode as far as Harrisburg bridge. Here a large washout was encountered, and they walked to Harrisburg, four miles away, arriving there at

5 o'clock in the evening. Three hours later they took a hand-car, and by 11 o'clock they reached Albany, a distance of 28 miles. Albany was left by hand-car by 9 o'clock Monday morning, and Salem was reached at 3 o'clock in the afternoon."

"They remained at Salem over night, and the next morning crossed the Willamette in skiffs. Darry was reached by wagon, and at this point the weary travelers were taken on board of a train. They all arrived at 6 o'clock Tuesday evening, and yesterday spent the day in sweet rest. Mr. Schwatka was on the road 13 days."

"Mr. Schwatka made the entire trip with no load beyond the clothes on his back. Sternberg carried about 50 pounds of sample cases from Medford, and Winn and Fenton each started out with about 20 pounds. Sternberg discarded half of his load at Woodville."

"The wagon-road between Canyonville and Glendale was blockaded with several large slides and trees which had been washed down, and the party was obliged to go around the mountains. For a distance of three miles the snow was knee-deep."

"The waters of Canyon creek were running like a mountain torrent, and the party found it a little hazardous crossing. The horses ridden by Miller and Sternberg stumbled once or twice and nearly precipitated their riders into the maddy water."

"Near Myrtle creek the party had to cross a trestle bridge, nearly half a mile in length, in the night. It was so dark that Schwatka missed his footing and he only saved himself by holding on to his arms. After he extricated himself he concluded that crawling along on hands and knees was the safer method of locomotion. He did crawl, and he crawled nearly 50 feet on terra firma, his hard-hearted traveling companions having failed to notify him that the bridge was passed. The next day Winn fell on a trestle bridge and succeeded in taking off three or four square inches of skin from the left leg."

"On the night of the 7th, Miller fell into a hole, which was covered over with water, and ran a nail through the palm of his hand. He pulled the nail out, wrapped the hand up and pluckily continued the journey."

"The railway men all along the line were very courteous and obliging, assisting the travelers whenever it lay in their power to do so. There was one exception, however. The section boss at Leland even refused to open his door to the strangers."

The facts of the undertaking of this trip by Mr. Schwatka are briefly and simply these: Col. John W. Drew, manager of the Rye Valley Hydraulic Mining Co. of Rye Valley, Oregon, visited San Francisco during January last past with the purpose of securing the services of some competent hydraulic miner to supervise the operations of the placer mines under his management. From testimonials which were furnished to him by the Joshua Hendy Machine Works of this city, who make a specialty of furnishing hydraulic mining machinery, communication by wire was had with Mr. Schwatka, who was at Yreka (railway communication being entirely suspended between San Francisco and that place), and arrangements were perfected by which Col. Drew left here by steamer for Portland, and Mr. Schwatka undertook the trip, as best he might, from Yreka overland to meet that gentleman at Portland. The incidents of the trip are given above, and they bring back reminiscences of the days gone by in the years of '49, when the hardy men of California dared, without a care, to brave the sweltering heats of mountain fastnesses in summer or their avalanches of snow in winter."

Mr. Schwatka has been for many years a resident of Siskiyou county, well and favorably known, and his heroic accomplishment of this journey proves that blood is blood; that the nerve and vigor displayed by Lieut. Fred Schwatka in his Arctic explorations came from his lineage; that he was born of a race of hardy, adventurous men."

A RAILROAD ACROSS SIBERIA is to be constructed by the Russian Government, and Gen. Annenkov calculates that within five years through trains can run between the Baltic and the Pacific. The eastern terminus of the line will be Vladivostok. The development of the valley of the Amoor, and the diversion to Russia of traffic which now crosses the Pacific or passes through the Suez canal, are among the chief gains expected from the Trans-Siberian railway."

PLACERS.—The northern portion of Montana is excited over the unexpected discoveries of placer gold quartz and silver and lead in the mountain spurs and hills of the great reservation, as well as in the belt of mountains. One mine near Maiden is crushing enough rock with a 20-stamp mill to turn out every month \$100,000 in bullion.

A NEW borax deposit was found recently 20 miles from Independence, Inyo Co. The lucky finders took 260 tons from less than three acres of the marsh.

THE Lompoc *Record* says one company of beach miners took out \$1500 worth of fine gold in two weeks recently.

POSTAGE.—There are only nine States in the Union where the postal receipts exceed the expenditures.

Gold Nuggets.

Advices from Charlotte, N. C., state that a gold nugget, weighing 50 pounds, has been found in the Tete Saunders mine in the Uwarle valley, Montgomery county. The mine is practically the property of Senator Jobu C. Spooner of Wisconsin and Senator George Hearst of California, who have an option on the property. The two senators visited the mine with mining experts, and made a thorough examination of the property. They left Dr. Riote of New York in charge, and he immediately began operations. After working nearly two weeks in prospecting, he struck the nugget at a depth of about 16 feet from the surface. The nugget is 14 inches in length, 6 inches in width and 3 inches in thickness.

The following account of nuggets found in California has appeared in print, but we do not know its original source:

A nugget weighing 266 ounces and valued at \$5000 was found at Minnesota, Sierra county.

A gold nugget was found, date not given, near Kelsey, El Dorado county, which sold for \$4700.

In 1854, a mass of gold weighing 360 ounces, and valued at \$6625, was found at Columbus, Tuolumne county.

In the year 1867, at Pilot Hill, El Dorado county, a boulder of gold quartz was found, which yielded in gold \$8000.

In 1849, a nugget was found at Sullivan's Creek, Tuolumne county, that weighed 28 pounds avoirdupois.

In 1850, a piece of gold quartz was found in French ravine, Sierra county, which contained 263 ounces of gold, worth \$4993.

A Mr. Virgin and others found a nugget on Gold Hill, Tuolumne county, which weighed 380 ounces, and was valued at about \$6500.

In 1876, J. D. Colgrove of Dutch Flat, Placer county, found a white quartz boulder in the Polar Star hydraulic mine which contained \$5760 worth of gold.

In November, 1854, a mass of gold was found at Carson Hill, Calaveras county, which weighed 195 pounds troy. This is the largest piece of gold ever found in the State.

On the 4th day of August, 1853, Ira A. Willard found on the west coast of Feather river a nugget weighing 54 pounds avoirdupois before and 49½ pounds after melting.

In 1856, at French Ravine, Sierra county, a nugget was found which contained considerable quartz, but yielded \$10,000, while another was found at an earlier date in 1851, the gold from which was valued at \$8000.

A Mr. Strain found a large slab-shaped gold quartz nugget near Knapp ranch, half a mile east of Columbia, Tuolumne county, which weighed 50 pounds avoirdupois. After crushing and melting, the gold was valued at \$8500.

A nugget of pure gold was found in the middle fork of the American river, two miles from Michigan Bluff, in the year 1864, which weighed 226 ounces, and was sold for \$4204. Another account of this nugget states that the weight was 187 ounces.

The first nugget of any great importance, and which played a prominent part in the early history of California, was found by a young soldier of Stevenson's regiment, in the Mokelumne river, while drinking from that stream. It weighed between 20 and 25 pounds.

A Frenchman found a nugget of gold in Spring gulch, Columbia, Tuolumne county, which was nearly pure gold, being worth more than \$5000. The finder became insane the next day and was sent to Stockton. The French consul recovered the nugget, realized its value, and sent the money to the finder's family in France.

The Old Dominion Copper Company.

The *Globe Silver Belt* (Arizona) says: There is a vague idea abroad that we have a big copper mine up here in this dimple of the mountain, but its real magnitude and value is not fully realized, owing to the remoteness of Globe from the beaten paths of travel, and also for the reason that the owners of the property, the Old Dominion Copper Co., and their local representative, have been conservative in the matter of giving information in regard to their operations. Knowing that the year 1889 was among the most prosperous in the history of the Globe mine, we were prompted to apply to Supt. A. L. Walker for exact data, which he has kindly furnished. From him we learn that during the year there was smelted in the company's furnaces 18,574 tons of ore, and 4159 tons of limestone flux was used. The amount of coke (domestic) consumed was 6,091,410 pounds, and of bullion produced, 5,915,510 pounds, .985 fine in copper. Thus it will be seen that the consumption of coke (no English coke being used) and output of metal was almost equal, pound for pound. The copper produced, too, was of an excellent quality, second only to Lake, and the superiority of the latter is so slight as not to justify the difference existing in price between the two brands. We did not ascertain the exact cost of bullion, but understand that last year it was lower than ever before and so small as to demonstrate the ability of the Old Dominion Copper Co. to compete with any other producer of copper in the United States.

The force of employees was increased during

the year, and there are now 140 names on the pay-rolls. The intention is to keep two furnaces running steadily. A new water-jacket has just been received from Fraser & Chalmers, giving the company a plant of three good furnaces.

A large amount of work is projected for the current season, the most important of which is the further sinking of the main, Interloper shaft, begun last Thursday, and the opening of a 7th level, which will be done as rapidly as possible. Two new cages have been placed in the shaft and two sinking pumps.

The success attained by the Old Dominion Copper Co. during the past season was due in a great measure to the intelligent management of Supt. A. L. Walker and his assistants, N. S. Berry, foreman of the mine, and J. H. Canavan, in charge of the smelter. Their long service with the company has given them that practical knowledge of the business in its every detail, so necessary to success.

Utah Ozocerite.

During the year 1889 the product of ozocerite, or "mineral wax," from the Utah mines was approximately 130,000 pounds, as compared with 65,000 pounds in 1888. The deposit, which covers 5000 acres, has been bought by a New York company. The attention of prospecting miners was first attracted to this curious mineral in Utah by seeing the Ute Indians making use of it in the construction of torches. For this use they wound the wax round a central core consisting of several long reeds or stalks of cane grass, which served as a wick. With a candle of this kind, two feet in length, the Indians were able to travel several miles in the night-time. The miners, from this hint, manufactured candles for use in their cabins, improving upon the Indian article by using strips of cotton cloth for wicking.

The Utah deposit promises to become of great value, as English capitalists have absorbed the Glacial ozocerite-field and raised the price of the article. It is useful in the industries and arts. Recently it has been discovered that ozocerite is the best insulating material known for the use of electricians.

Thomas Parker of this city, says the *Virginia Enterprise*, who prospected extensively in Utah in the early days, says he might to-day be the owner of the whole ozocerite-field had he known its value. He says that he then, in common with the other miners in that region, thought the "stuff" to be merely dried and waxy petroleum ooze, and that probably at depth there were below it large fountains of coal oil.

Mr. Parker relates that on one occasion some miners one night set fire to the ozocerite at a place where great quantities of the substance cropped out from the seams in the slaty rock on the side of a hill. The flames spread rapidly, and soon there was seen pouring down from the hillsides a torrent of melted wax, forming a grand caecode of fire.

The men were for a time afraid they had set the world on fire, and made a rapid retreat to a safe place on an opposite hill, whence they viewed in awe the grand spectacle—a veritable Niagara of fire.

The next morning the fire was out, it having burned down into the interstices of the rock only a short distance. Mr. Parker is of the opinion that in this "miners' freak" there was destroyed not less than \$50,000 worth of ozocerite, as in places on the steep side of the hill it had accumulated in large corrugated heaps, some of which were a yard in thickness. He says that there was at that point more of the wax in sight than anywhere else in the country previous to the experiment of firing it, but the next day little was to be seen except scorched and blackened rocks.

MINERAL SUBSTANCE FOUND IN DRAIN-BOXES.—A piece of sediment was recently taken from a drain-box in a tunnel in the Overman mine that is the exact shape of the box in which it was found, with all sides of equal thickness and as hard as stone. The specimen resembles porphyry in color, and is as hard as the hardest variety of that material. The sediment hardened after the flow of water in the drain-boxes ceased, and is the product of the mineral substances contained in the water. An assay of the specimen showed that it carried both gold and silver, the latter metal predominating. In all underground drain-boxes in old tunnels in Comstock mines the above-described sediment is found, but this is the most perfect specimen yet exhibited.—*Virginia Chronicle*.

SWALLOW-TAILS FOR MINERS.—The wealthy Japanese owner of the Wakeo copper mine, Japan, is about to celebrate in a rather peculiar manner the 200th anniversary of the mine coming into the possession of his family, says the *Japan Gazette*. The celebration takes place about the beginning of March, and on that occasion each of his 300 or more employees will receive as a memento of the occasion a swallow-tail coat. The fortunes of Mr. Smitomo's family were retrieved some years ago by the mine in question, when they were on the decline.

MINER TIMBERING.—A recent experiment to ascertain the difference in cost of timbering a shaft with cribbing or square sets demonstrated that the latter system consumed 115 feet less of lumber than by cribbing for each square set.—*Virginia Chronicle*.

The Supreme Court of the United States.

Among the many centennial anniversaries in this country, none were more impressive than the one recently commemorative of the centennial birth of the Supreme Court of the United States. Ex President Cleveland presided, opening the meeting with a very felicitous speech. The important part this tribunal has taken in the history of our country was duly set forth and landed by several distinguished speakers.

In the current number of the *Forum* is a notable article on the power of this tribunal that is well worthy of serious study. There are few outside of the legal profession that are aware of its unique and tremendous power. There is nothing like it in the judicial system of the world. In the most despotic lands there is no court that has the power to make or unmake constitutional law, limit the prerogatives of the sovereign and control legislation. The form of the government in this court is as clay in the hands of the potter. In the language of this writer, "It has power above that of the chief magistrate of the nation, superior to that of Congress, higher than that of any State and equaled only by that which made or can amend the Constitution. It can enlarge or limit the prerogatives of the President or the power of Congress. It can change the relations between the States and the nation. It can extend or restrain the central power or State sovereignty. In matters of federal concern, it can fix the bounds of the executive or the legislative authority of any State, Federal courts, and on national issues, State courts are ruled by its decrees. In short, it can make or unmake the constitutional law of the country. It can introduce radical changes in our form of government. Not only can the Supreme Court wield these vast powers; it has long done so, and may continue to do so."

This is a fearful investiture of power, and there seems to be no help for it. The Constitution is the supreme law of the land. It is a scheme of government. It enmeshes certain powers with their limits. This is not done in language so exact that there is no chance for mistakes, no room for difference of opinions. The production of such an instrument would have been beyond human foresight and wisdom. The Constitution has never been free from doubt, nor ever will be. Grave questions are ever coming up that must be decided. When there are antagonistic views, who will decide? Are the prerogatives of the President to be fixed by the President? Has Congress the right to construe the Constitution for itself? No doubt of it, unless the power is lodged elsewhere; but it is lodged elsewhere. Under our system the Supreme Court is made the interpreter of the Constitution. Its deliverances are binding on the executive, the legislative department and on every State government. Its decrees are part of the supreme law, a part of the Constitution. What is the Constitution? Just what the Supreme Court declares it to be.

Then whatever judgment this tribunal renders is final. There is no appeal only to the court itself or the power that can amend the Constitution. It may overrule its own decisions. It may change to-morrow the opinion of to-day. It has often done so, but the President, Congress, no State can reverse or modify its decrees.

And this vast power may be wielded by five men, and sometimes even a smaller number. Four hundred representatives of the people in the House and Senate may enact a law, the President may approve of it, the people demand it, but five men in black robes, sitting in a small room of the Capitol at Washington, may quietly set it aside. Three-fourths of the States and two-thirds of Congress may graft upon the Constitution a measure they deem of importance, and five judges may declare it void.

It is true these men are under solemn oath to expound the Constitution. But they are men with like passions and partisan ideas as other men. They are human and often swayed by popular prejudices and convictions. They have no sounder judgment when they put on the ermine than before. The Dred Scott decision was the embodiment of the slaveholders' views of the Constitution, but ten years later the court with a new personnel changed the whole aspect of public affairs. The Constitution was the same in 1867 that it was in 1857, but the difference was in the view of the court. The hundred and thirty odd volumes of the reports of the decision of this court abound with conflicting opinions. It is a chaos that even the genius of Judge Story failed to reduce to order. In hundreds of cases, as in the construction of the Fourteenth Amendment or the legal tender Act, this court has rendered decisions on both sides of the case, and in one instance, at least, must have been wrong.

And this body, with these surprising powers, is appointed by the President with the approval of the Senate, and once in office these men are beyond the control of the President or Congress, beyond even the control of the people, for they are appointed for life or good behavior, and can only be removed by impeachment or the power that made the Constitution. They may retire at 70 years of age, with a continu-

ance of salary, but are not required to do so. Congress may make a law increasing the number of these judges, but cannot reduce their number.

How it Works.

All legislation is experimental. We have a great many fine theories that look well on paper, which when taken out into the field fall to work. They are not adapted to the soil or climate, and have to be thrown into a fence-corner. We have been told, by certain politicians, that the Australian ballot might work very well in Australia and other countries, but it is not adapted to a democratic form of government. Well, it is a rough old saying that the proof of the pudding is in the eating, and we may settle this question in the light of experience.

The Massachusetts Legislature in 1888 passed the Australian ballot reform without any essential modifications, and the law went into operation at the last November election. No expense was spared to give the system a fair trial, and the result has been eminently satisfactory. The chief difficulty was apprehended in large cities, but in Boston, where many predicted a failure, the result was a general surprise. The city was divided into 286 voting precincts, with an average of 176 voters cast at each on election day. The average time required by each voter was about two minutes, and with the ample accommodation afforded, the polls could have been closed within two hours, if all the voters had promptly been at their respective precincts at 7 o'clock in the morning. It is the uniform testimony that at no time of the day had any voter to wait. The expense was less than under the old system.

One of the advantages, it was noticed, of the State's assuming the expense of printing and distributing the ballot, was the increase in the number of independent candidates, many of whom were victorious over the regular partisan nominees. This tendency to independent action will more and more assert itself as time goes on and people break from the thralldom of the political yoke, and surely this is some good. That this method of voting will check bribery and tend greatly to the reduction of the depravity and corruption incidental to voting, seems to be the opinion of the best statesmanship of the country, irrespective of party.

Governor Campbell of Ohio, in his message on the subject, apprehends an evil of as great a magnitude as direct bribery, namely, the refusal of voters to vote for their own party unless hired to go to the polls. He suggests this difficulty may be reached by a compulsory election law with severe penalties. But public opinion would hardly tolerate the enforcement of such a law. It strikes us this evil is largely imaginary. The real crime against free government is not in refusing to vote, but in trying to be paid for doing one's duty as a citizen. It may not be found impossible to provide permanent disfranchisement as a penalty for taking a bribe or seeking to be hired, and that particular penalty the workers of either party could so effectively enforce that not many voters would consent to put themselves in the power of the workers.

At any rate, let us see to it that "the political bosses must go" by this or some other law, and that soon.

CLEANING OIL BARRELS.—The question is asked if coal-oil barrels can be cleaned for meat. A friendly farmer writes: "I have used them for 15 years with perfect success. Knock out the head, set fire to a piece of paper, and put it in the barrel. The fire will burn with a loud roar. Roll the barrel around so it will burn out even, and when it is burned one-eighth of an inch deep, and the barrel up on the open end; the fire is instantly quenched. If it is not charcoaled one-eighth of an inch deep, turn in about a pint of coal oil, roll around until it is spread all over the inside, then fire again. Scrape off most of the charcoal and wash it out. It is not necessary to burn over one-eighth inch deep. I will guarantee there will never be the slightest taste of coal oil in the meat. I have used these barrels for ham, pork, beef, lard and boney. Old musty or tainted barrels I treat in the same way by using a pint or so of oil. Have treated lined oil barrels the same way."

THE UNDER WORLD.—Under the most intense chemical rays of the spectrum ants are thrown into most violent perturbation, while they go quietly about their business under the color-rays. A pistol-shot over their heads causes them not the least disturbance except that which is occasioned by the mechanical jarring of the earth and air; sound, plainly, is not to them what it is to us. It is not their mindlessness that gives ants another world than ours, but the construction of their sense organs.

FUEL GAS PLANTS have become quite numerous during the past year, and when the statistics of the present year have been gathered in, it will be a surprise to most people. Fuel gas is no more a problem, save as to the relative merits of the various processes.

The U. S. Senate has passed the following bills: Increasing the limit of cost for public buildings as follows: San Francisco, to \$800,000; Sacramento, \$300,000; and making an appropriation for public buildings at Los Angeles of an additional \$370,000.

Silver Coinage.

The Silver Coinage bill reported from the Committee on Finance provides as follows:

SECTION 1. That the Secretary of the Treasury be hereby directed to purchase, from month to month, silver bullion to the aggregate amount of \$4,500,000 worth in each instance, at market prices, not exceeding \$1 for 371.25 grains of pure silver, and also to purchase gold bullion as may be offered at the Treasury or any sub-Treasury of the U. S. at a price not exceeding \$1 for 23.22 grains of pure gold; and to issue in payment for such purchases of silver and gold bullion Treasury notes, to be prepared by the Secretary of the Treasury in such form and in such denominations, not less than \$1 nor more than \$1000, as he may prescribe. A sum sufficient to carry into effect the provisions of this Act is hereby appropriated out of any money in the Treasury not otherwise appropriated.

SEC. 2. That the Treasury notes issued in accordance with the provisions of this Act shall be redeemable on demand in lawful money of the U. S. at the Treasury of the U. S., or at the office of any Assistant Treasurer of the U. S., and when so redeemed shall be canceled. Such Treasury notes shall be receivable for customs, taxes and all public dues, and when so received may be reissued; and such notes, when held by any national banking association, may be counted as part of its lawful reserve.

SEC. 3. That the Secretary of the Treasury shall coin such portion of the gold and silver bullion purchased under the provisions of this Act as may be necessary to provide for the redemption of the Treasury notes herein provided for, and any gain or seigniorage arising from such coinage shall be accounted for and paid into the Treasury.

SEC. 4. That the gold and silver bullion purchased under the provisions of this Act shall be subject to the requirements of the existing laws and regulations of the Mint service governing the methods of determining the amount of pure gold and pure silver contained, and the amount of charges or deductions, if any, to be made.

The next section repeals the Coinage Act of February 28, 1875, and the final section puts the Act in force 30 days after its passage.

Long and Short Hauls.

Senator Paddock yesterday introduced a bill to amend the long and short haul clause of the Interstate Commerce Act. This bill repeats, *verbatim*, the original Section 4, forbidding a less charge for a longer haul, except by special permission from the Interstate Commerce Commission. It then provides, further, that in case a complaint shall be made against any transportation company for a violation of that section the Commission shall take into consideration all evidence regarding the character of the products so carried, the cost of transportation, nature of markets and all facts and circumstances bearing upon the question. If it shall find that the merchandise so carried consists of products which are considered among the necessities of life, such as grain or food, and that the conditions of transportation and markets are such that a lower rate for a longer haul may become a necessity to its carriage and a matter of public utility, then it shall consider the case an exception to the general rule provided by the long and short haul clause, and shall make an order accordingly. The long haul, within the meaning of this amendment, shall be 500 miles or more.

The effect of this amendment, if adopted, will be in a great measure to free the hands of the transportation companies. Just to what goods it may prove applicable will be a matter for interpretation. "Necessaries of life" is a term capable of wide extension. It will not limit the application of the rule thereby to "grain or food," but, under the requirements of modern civilization, may be made to include almost anything that does not come clearly under the head of a luxury or superfluity. There is also this radical difference: Under the original law, the companies could not cut rates on long hauls without first obtaining permission from the Commission, and that permission rested with the judgment or caprice of the members. Under the amendment, the companies, without consulting the Commission, can proceed to adjust their long-haul rates to the exigencies of business, and if any complaint is made, and they can show the Commission that the case comes within the provisions of the amendment, then the Commission is legally bound to respect their position.—*S. F. Bulletin*, Feb. 25th.

HARRY HARTLEY, the discoverer of the Meadow Lake mines, is passing the winter there. He lives there alone in the best house in town. The snow is 40 feet deep and he passes in and out of the house, which is two stories high, by means of a trap-door and a ladder.

THE Mount Cory stamp-mill, at Mount Cory, near Hawthorne, Esmeralda county, Nev., is being dismantled. The mill cost \$750,000 and was probably sold for little above what the iron cost used in the construction of the expensive plant.

A PLUSH-COVERED PIANO has been sent from Paris as a forerunner of a fad that may be expected later.

"Only a Poor Miner's Wife."

In all communities are found those who will disagree, and unfortunately Park City is not different from other places in that respect. Two women in the Park recently quarreled over some difficulty that arose between them. One was the wife of a miner, the other of a man who makes his living without coming in actual contact with the pick and shovel, hammer and drill. In their excited debate, the last-mentioned, feeling, no doubt, that the former had overstepped the bounds of caste by being in her presence, let alone preening to question with her, cried out: "And what are you, pray?" and tauntingly added, "only a poor miner's wife." "Only a poor miner's wife," yet within her breast existed courage which she who taunted her could only dream of, for it requires the highest moral courage to be a "miner's wife." Added to her household and family cares, she has, daily, the horrible probability of the support of herself and children being thrown upon her shoulders. Every farewell kiss of the miner husband but reminds his wife that he may return a corpse, torn and bleeding from some horrible accident, mangled by a blast, crushed by a cave, or mutilated beyond recognition by a fall to the bottom of some ralse or shaft. If not so serious, he may return a cripple, with a leg broken, or foot crushed by a falling rock; the blow of a hammer has miscarried, and a crushed hand is the result; a flying piece of steel from the point of a pick or the head of a drill has put out an eye, or some other of the many dangers to which he is exposed has befallen him. Every time the door closes and the husband is off to work, she cannot but think that before the shift is over she may be a widow and her little ones fatherless, left alone to fight the world and its battles. Such thoughts, such contemplations, are not calculated to make the life of the "miner's wife" a happy one, and "her every moment a joy." Yet she is cheerful and exerts every effort to make home pleasant and comfortable, and to banish from her mind the terrible dread of what is almost certain to happen. Could she, who taunted the "miner's wife," be made to live her life for one week, nothing but words of praise would ever again pass her lips. She would realize that among those to be honored for their love, devotion and courage, the "miner's wife" deserves a high place. To all womankind to whom "only a poor miner's wife" applies, we say, "All honor."—*Park City Letter in S. L. Herald*.

Snow Buried.

Eureka hill is buried in snow. The chimneys are spiced to get above the snow and the attic windows are the only means of access to the houses, which are lighted with artificial light day and night. A few have run tunnels in the snow, but they, too, have to be lighted, and most of the people prefer climbing to the natural light, as fuel for lights is scarce. The 20-foot of snow makes no difference to the miners, who work underground, and go to and from the mines on snowshoes. The quartz-mills are built strong and the chute from the upper tunnels to the mill, down in Johnsville, one-quarter mile below, is covered so that the harness of the miners moves along with the same regularity as though there was only a foot or two of snow on the hill. The greatest difficulty for the few miners with families is to find their houses and families after a heavy fall of fresh snow on their return from the mine. The pole they tie the lines to usually has the name of the owner tied to it, but the terrible storms of that high altitude sometimes throw the tag off, or cover both pole and tag deep in the snow. The people of Johnsville, who live immediately under Eureka Hill, are somewhat better off (unless they get an avalanche from the hill), as they only have about 16 feet of the "heavenly." They have hotels and saloons where they can swap "stories" to pass the long, dreary days and evenings during the roaring of the storms. The people of Eureka Hill have neither a hotel nor saloon in which to while away the long evenings, but instead, they go two or three times a week to the public schoolhouse for prayer; so wicked are they that not less than twice a week will give them insurance against the tortures of an imaginary future hell for their imaginary wicked souls.—*Sierra Valley Leader*.

A SNOW BLOCKADE of ore-house sidetracks the greater part of the last week will reduce the February bullion yield of the Comstock mines \$150,000 below the usual monthly average. The tracks are now open and the Carson river mills again in full operation. The only sidetracks kept clear during the recent continued snowfall were those leading to the Con. Cal. & Va. ore-houses, the report of the shipments showing that they reached nearly 3000 tons the past week—which is above the usual average.

The new cantilever bridge across the Colorado river 13 miles below Needles, Cal., will require 3,200,000 pounds of iron to complete it. It rests upon two massive stone piers that are 65 feet below the bed of the river, and the center span is the longest unsupported one in the world—660 feet between the cantilevers. The contractors expect to have the bridge finished by May 1st.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

AMADOR GOLD MINE.—*Ledger*, March 1: The affairs of this mine have undergone no change during the past week. The miners have not been paid yet, and consequently have not returned to work. It is not likely that either the company or the employees desire to resume operations until all the arrears of wages are settled. A few men are employed in getting the mill machinery in place as fast as it arrives. It is coming in very slowly on account of the bad roads. Only two or three loads of concentrator machinery have come up this week. At the mine only the pump is kept going. We are able to say, however, that the stockholders are fixing up their difficulties, and no doubt everything will be running again in a few days. The men will be paid all that is owing them; there is no question about that. The new superintendent is expected up this week, and will take charge at once.

KENNEDY.—The mill is now running to its full capacity of 40 stamps. The rock is of good quality, and in the deepest levels is met with in larger quantities than above. At a meeting of the directors held recently, John Barton was elected president, in place of T. Varney, deceased; Mr. Belshaw, vice-president; and E. Judson was elected a director to fill the vacancy on the board caused by the death of the late president.

El Dorado.

LOTUS NEWS.—*Mountain Democrat*, March 1: A. J. Hare, superintendent Pine Hill G. & S. M. Co., says: In your issue of Saturday, 21st instant, under the head of "Lotus News" the following item appears, viz.: "The Arthur brothers, Mitchell and James, have relocated a quartz claim, which for the past 20 years has been claimed by Tom, Dick and Harry, and no assessment work done on the same. The above gentlemen while prospecting for the past years for quartz and silver mines, came upon what is known as the Wild Cat mine in Wild Catravine, southeast of Gaylord's bridge on Webber creek and relocated it, and are now busy working the same." Permit me to correct a few errors into which your correspondent has fallen. First, the above-named mine is the property of the "Pine Hill Gold & Silver Mining Co." [Incorporated] and is of record as such on the books of the "Gold Hill mining district" and has been owned by said company since the year 1885. Secondly, your correspondent says that "no assessment work has been done on the mine for the past 20 years." Now if your correspondent would have taken pains to inform himself, he would have found that the company have a double compartment shaft 438 feet and about 25 feet deep, timbered in the most substantial manner—the result of assessment labor, and that during the year 1889 other improvements have been projected, the principal of which has been the opening of a wagon-road leading from said shaft to the Coloma road near Gaylord's bridge, which will enable the company to haul material to and from the mine, which has heretofore been almost inaccessible. The only means of reaching the mine with teams or wagons was by a circuitous route of some six miles of rough and rugged road, while the present road will not exceed one mile in length. The company contemplate the erection of hoisting works on the mine at an early day, and arrangements have already been made with the Pyramid Mill and Mining Company for the crushing of a large quantity of ore as soon as the road can be completed whereby it can be delivered at the mill at a reasonable cost. In short, the assessment work has been done and the mine was not subject to relocation.

A SEAM.—*Georgetown Gazette*, Feb. 27: J. C. Chesrown and George Spencer have been engaged for the past few weeks running on a seam in the long tunnel on the LeBoeuf mine. They have some very good prospects.

Montsrey.

LOS BURROS MINES.—*Cor. Salinas Democrat*, Feb. 27: Los Burros is alive yet, and the fiery, untamed burro is alive and prancing up and down Gold Ridge. The cause of the hilarity is the rich strike made on the Melville mine by Charlie Hudson and Fred Melville. The boys have one of the best mines in the camp. Their vein is in rotten slate and porphyry, and the dirt at the croppings of the vein will average 25 cents to the pan. The Cruikshank's M. Co.'s mill started up again a few days ago. In the mine they have commenced sinking their double compartment shaft from their tunnel level down. It is hoped that the water will not be too much for their present pumping machinery to handle; then we can look for something permanent when their shaft is sunk 250 or 300 feet deeper. The Grand Pacific Co. are pushing ahead their tunnel. They have lately cut a small vein of low-grade ore and are laboring under great difficulties to push their tunnel ahead to the main shaft on account of immense quantities of water coming in. The Grizzly Co. is erecting a 30-foot overshot water-wheel to run an anastha on Alder creek. They are also taking out some very rich ore from their incline shaft. The Manchester tunnel is being pushed with great vigor. Chas. Arrivey is getting some very good prospects on his Atlas mine.

ASPHALTUM AND BITUMEN BEDS.—*Salinas Democrat*, Feb. 23: We were shown yesterday several specimens of asphaltum and bituminous rock, by Dr. H. D. Livingstone of Kings City. The specimens were all in their crude state, except one, and were taken from the claims recently located by the doctor, Isaac Mylar and Thomas Mylar, about nine miles from Kings City. The deposits are on the side of a hill and are practically inexhaustible. Removing the earth, the deposit is found at a depth of about three inches beneath the surface. At places the effects of the sun's heat are seen in quantities of the asphaltum exuding through the crust and from the crevices. Dr. Livingstone showed a beautiful specimen of pressed asphaltum ready for use in paving streets and making roadways. The nearness of the deposits to market and their accessibility over a smooth road, making it possible to draw heavy loads to the railroad, coupled with their volume, makes this a valuable find. The rock can be laid down at the railroad at about \$5 a ton, while Santa Cruz rock sells in the San Francisco market at \$10 to \$12

a ton. Dr. Livingstone leaves to-day for San Francisco to make arrangements to put the product of his mines on the market and endeavor to interest contractors in giving it a practical test.

Nevada.

WILL START UP.—*Grass Valley Union*, Feb. 27: Operations on the Homeward Bound mine, a portion of the Menlo property, are to be commenced forthwith. Some repairs will first be necessary about the pumping and hoisting works, and the shaft will have to be cleared of debris that has accumulated during the time the mine has been idle, but this can be done in a few weeks, when regular underground work will be started. John Rawling will be the foreman of the mine.

PROMISING OUTLOOK.—*Grass Valley Tidings*, Feb. 25: Operations at the Crown Point mine have been vigorously pushed right along through this last storm, water for power being derived from Wolf creek. The shaft has been put down 80 feet by the bondees, giving a total depth of about 380 feet. The ledge is in the footwall, but as numerous good-looking stringers are cut weekly in the shaft, it is thought the vein may be found in the hanging-wall before the contractors complete the next 20 feet of shaft. It such should not prove the case, a crosscut will be run to the hanging-wall and the ledge uncovered. The outlook is regarded as promising.

MENLO.—Mr. John Rawling, who has been appointed superintendent of the Menlo mining property at Allison Ranch, under the bondees, is already arranging for the prompt performance of the preliminary work. The pumps will be in operation in two months or less and at least \$3000 per month is to be expended under the bond.

CROWN POINT.—*Grass Valley Union*, March 2: The crown wheel of the pumping machinery of the Crown Point mine broke on Wednesday and repairs upon it were not completed until Friday night. In the meanwhile the water raised in the mine to an extent that will require four or five days to reduce it. Some good-looking quartz is found in the ledge in sinking the shaft, which prospects in gold, and gives encouragement for the next level that is to be opened.

HARTERY.—Mr. A. W. Stoddard has resigned the superintendency of the Hartery mine and Stephen Fowler, who has heretofore been acting as underground foreman, has been selected to succeed him. Mr. Stoddard yet remains as president of the company and retains his interest as a stockholder. The mine is in good condition, the ore being of high grade, as was shown by a recent crushing, and the company is virtually out of debt. As an undeveloped property the Hartery is giving most excellent promise of becoming a valuable mine.

NEW MINES.—*Grass Valley Tidings*, Feb. 26: Six months hence the storm and its effects on business will have been all but forgotten. The list of our mines of last year will by that time be swelled by six and perhaps seven, for the increased number of men that will be employed at the Coe, Peabody, Hartery and Crown Point will justify us in claiming those properties as new mines. Then there are the Menlo and Gold Hill properties, with perhaps the New York Hill. In any event the Gold Point will make the seventh and add a new mill. Street talk has it that Mr. Fillmore, formerly foreman at the Omaha and now in Monterey county, will return soon to take charge of the Gold Hill. The Idaho, North Star, Omaha and Empire mines may be set down as dividend-payers this year, and we would not be surprised if the North Banner was added to the list.

HARTERY CLEANUP.—The last of the ore at the Hartery (Larimer) mill was run through the stamps, and the cleanup made Tuesday. With the partial cleanup of last week included, an average of between \$35 and \$40 per load for the entire crushing was realized. The pump is holding the water in the shaft without difficulty, and could wood he had the miners could go to work and hoisting be resumed. Under the circumstances, however, development work cannot be prosecuted for a week or more.

QUARTZ.—*Grass Valley Tidings*, Feb. 28: We were shown to-day some handsome specimens of gold quartz taken from a winze in the Knights of Malta (St. John's) mine, at a point too feet from surface, a number of years since. The ore is sprinkled with gold in sulphurets and galena. In conversation with Mr. Dewar we learned that the new company formed to operate this mine have disposed of all the stock desired to be held at present, the investors including residents of Grass Valley, Marysville, Sacramento, Visalia and San Francisco. A boiler and engine have been secured and paid for, negotiations for a pump are under way and building material has been contracted for. As soon as the snow disappears, work will be commenced, with L. M. Carr as the builder, in all probability. One of the old shafts may be utilized, but it is more likely that a new one will be put down.

Placer.

EUREKA.—*Placer Argus*, March 1: We mentioned last week that F. Chappellet had resigned his position as superintendent of the Mayflower mine. He still retains charge of the Live Oak and has been chosen superintendent of the Eureka mine. The Eureka Mining Co. has been organized with the following directors: F. Chappellet, H. Barroillet, J. Morizio, Anthony Clark, J. C. Plunkett, W. H. Rabe is secretary, Belloc & Co., treasurer, and F. Chappellet, superintendent.

IOWA HILL.—*Cor. Placer Herald*, March 1: The Waterhouse and Dorn mine has been shut down for a few days past, on account of an insufficient supply of water to run their machinery, the ditch having been broken near the head during the storm. The Morning Star mine force has been laid off, most of them also lately, but I hear they will soon resume work. At the Pioneer a force of men has been driving the main tunnel ahead to connect with the Lynn ledge; whether they have succeeded or not I do not know. A sad accident occurred at the Red Point on Saturday night. A large slab of the roof, some 50 feet in length, fell and caught several of the men, killing George Patrick and four Chinamen. Mr. W. James, Fred Snyder and G. W. Snyder's nephew were also caught, but I believe none of them were seriously injured, Fred Snyder being badly bruised. It is believed that death was instantaneous in the case of George Patrick.

Santa Barbara.

COAL.—*Santa Barbara Press*, March 1: P. Montanaro has discovered a vein of coal of the best

quality in the San Rafael mountains, a short distance from Santa Ynez, and has already been offered a large sum by rich parties for the mine if it proves to be a paying institution. These mountains surely contain coal, and if Mr. Montanaro has discovered the right place it will not be long before Southern California will come to the front as a coal-producer.

BEACH MINING.—*Lompoc Record*, March 1: The Woods Brothers, of Santa Cruz, have at the Lompoc Landing all the machinery necessary to work the beach mines successfully. The process is said to save all the gold wherever this apparatus is in use. We will probably have a practical demonstration of what this new invention will do, as there are several claims that can be had on fair terms. Mr. Woods informs us that he can put through from 40 to 50 tons per day. It is estimated that \$3 can, with washing that will save all the gold and platinum, be extracted from every ton of sand. The total expense of securing and putting through this machine 50 tons is about \$1 per ton. It will be seen that at a yield of \$3 per ton, there is a fine margin of profit when worked on the scale of 50 tons per day.

Shasta.

NEW MINING ENTERPRISE.—*Redding Democrat*, Feb. 26: Mr. O. J. Johnson, president of the Eureka Tellurium G. M. Co., states that he is expecting a party from the East who is connected with the Elgin, Ill., Reduction Works, to look over the Eureka property. The Elgin Reduction Works Co. has made an offer to put a plant on this property if, upon investigation, it is found as represented, and we shall in the near future see a plant erected at Salt creek for the reduction of the tellurium ore and other refractory ores that may be brought to the works from any part of the county. Bids will be received by the Eureka company for the construction of a tunnel about 600 feet long. The Anavena company proposes to run a tunnel three-quarters of a mile in length on their property at or near Clear creek, in the Muletown mining district, and we judge from the interest taken in these mining enterprises that thousands of dollars will be spent the coming summer by the Anavena, Clear Creek and Eureka Tellurium G. M. companies in erecting reduction works and developing their mining property.

LOWER SPRINGS.—*Cor. Redding Democrat*, Feb. 26: Mr. Comins of Red Bluff came up to Kempton's mill, on Salt creek, on the 16th, and took his portable engine from the wrecked building and will move the same back to the Bluffs. Some time last fall McCort of San Francisco leased the engine from Comins to supply power for the mill. McCort had no capital to go on, consequently the mill was shut down. The Russell furnace still remains in place with no perceptible damage from the fallen building. The long-delayed six-foot Pelton water-wheel arrived at the G. M. and will be running by March 1st. Mr. C. Olmstead has gone to Illinois to raise capital for the necessary improvements in and about the works, so as to begin with firmness and establish a reputation that will make it a creditable mill, suitable for both rebellious and free-milling ores.

"OLD DIGGINS."—Mr. Scharard, a mining man of the southern part of the State, has taken hold of the old Reid mine on Star gulch, Old Diggins district, and intends to sort and ship ore. There is a good body of rich refractory ore in sight in this mine that will pay well to transport.

FROM ONO.—*Cor. Anderson Enterprise*, Feb. 27: A mine at Sunny Hill, known as the Big Charley mine, was bonded from Valentine Doll and Manual Leffler one year ago this month by the Bell Bros. for \$10,000, since which the money has been paid according to agreement. Doll & Leffler receiving \$3333 33, or one-third each of the money. Who got the other third is not known. They have a tunnel 400 feet in length through rock to strike the ledge; have on the dump about 30 tons of ore for shipment which will be hauled to Anderson as soon as weather will permit. A team went to Sunny Hill yesterday with a complete outfit of blacksmith tools for Bell Brothers.

Siskiyou.

BIG DITCH.—*Yreka Journal*, Feb. 26: Some four or five Portuguese companies at Hawkinsville having leased the Big Ditch, commenced work on the same last Wednesday, to put it in good order and build new flumes, etc. They received assistance from business men in Yreka to the extent of \$200, and other assistance from parties in the vicinity who are interested in the development of the rich mining ground at Hawkinsville and on Yreka flats, not worked for some years past on account of scarcity of water. A force of a dozen men started out to the Forest House creek, five miles south of town, last Wednesday, well supplied with provisions, to camp out on the ditch in the work of repairing it in first-class order from that point to Shasta river, as there will probably be water enough from that and other streams and gulches in Yreka basin to keep up a supply nearly all summer for mining. When the supply gets short toward fall, the ditch will be put in order above the Forest House creek so as to gain a supply from Shasta river. The miners on Canal, Long, Humbug, Spring, Portuguese, Greenhorn and other gulches in the Humbug range along the west side of town, are all busy now while the snow lasts in furnishing water to rake in all the gold-dust possible, this being the first season for many years that a good supply of water has been afforded above the level of Yreka flats and the Big Ditch. There is some very rich paying ground in all the above-named gulches clear to the summit of the mountains not accessible with wagons for hauling the pay gravel to water. On Humbug creek the miners are making preparations to rebuild the badly demoralized wagon-roads leading from their quartz ledges to mills, as soon as the deep snow melts off sufficiently to permit. At present they have only a pack trail dug out for temporary use in getting supplies. The hydraulic miners have commenced fixing up their ditches and will have sufficient water this season to continue work with their giants nearly all summer. The sluicing out of the streams and opening of deep cuts in the mountains will give prospectors a splendid opportunity during the coming spring and summer to hunt for good mines, especially in the districts all along the Humbug range and Klamath river, where the forest fires of last summer laid the country bare. The quartz ledges lately discovered on Humbug creek, now turning out so rich and permanent, will cause many old miners to start out on prospecting tours just as soon as the snow is off the mountain-sides to permit of prospecting with success. A correspondent of the Scott Valley News

says the laboring population of Happy Camp has been very profitably employed for about three months working on bedrock belonging to Camp & Co., and which has never been thoroughly cleaned. In some instances a single workman has taken out as high as \$20 a day, and nearly all have averaged a large percentage on the amount of labor expended.

MINING AND FARMING.—Hugo Miller, who owns the old Koester place or orchard at Hawkinsville, on Yreka creek, is having it seeded with alfalfa, and also intends planting a portion with a large number of fruit trees. Next year Miller expects to work the creek portion of the land for gold mining, and has a mammoth pump with a 6-inch discharge pipe capable of keeping the bedrock clear of water, and at the same time supply sluice-boxes with sufficient water for washing the pay gravel raised by derrick. The pump and derrick and other apparatus necessary can all be worked successfully by a stout little steam engine.

SCOTT BAR.—*Yreka Union*, Feb. 27: The Quartz Hill Co., at Scott Bar, have resumed work in their mine at that place. They are at present repairing damages to their ditches and flumes, which were considerably demoralized by the late storm. The San Jose Co., at the same place, are also engaged in cleaning ditches and getting everything in readiness for this season's run.

Sonoma.

QUICKSILVER.—*Sonoma Democrat*, Feb. 27: R. E. Lewis, superintendent and one of the principal owners in the Great Eastern Quicksilver mine, near Guerneville, called in to see us on Thursday. We learn from him that the Co. is now working about 50 men and shipping an average of about 120 flasks of 75% pounds each of metal per month. There has been a gradual advance in the price of quicksilver for three years past and the metal is now selling at \$48.50 per flask. The Great Eastern is the only mine in this county that has been run continuously since its opening. It was located by Mr. Lewis in 1872 and patented in 1876. The original owners, all of Healdsburg, leased it to Thurocio Parrott for 12 years. For the last five years the owners have conducted the mine, with Mr. Lewis as superintendent, on their own responsibility. At \$1 per share the mine paid last year a dividend of 26 per cent on the capital stock. The Co. is burning about 16 tons of ore every 24 hours, which yields four flasks per day, equal to about 1 1/2 per cent. Few people are aware that we have such an important mining industry permanently operated in this county. The officers of the company are Richard Abbey, President, R. E. Lewis, Vice-President and Superintendent, and Alfred Abbey, Secretary and Treasurer.

Trinity.

JUNCTION CITY.—*Trinity Journal*, March 1: J. C. Wallace was in town Wednesday and gave us the following items: Geo. Chapman started up his hydraulic claim last Monday. The Sheridan brothers are also running their claim. With this exception no mining is being carried on there at present. Most of the mines in that vicinity have considerable work to do before they can run. Mr. Wallace thinks that when the mines start the season will be favorable for them; that a large amount of dirt will be moved and a good deal of money will be taken out. W. C. Given is at Cox bar, putting in a dam for Bigelow & Jordan to replace the one that broke last winter. D. B. Gray, the mail-carrier between Junction City and New River, says that the dam across the Trinity river, formed by the slide at Dixon's bar, will be permanent. The water is now backed up several miles and near the dam 30 feet above high-water mark and almost as still as a millpond.

QUARTZ.—Eight quartz location notices were filed in the Clerk's office this week for recording. The ledges are at the head of Rock creek on the divide between Eel and Mad rivers. This is a new region for quartz and we hope the locations will turn out well.

Tulare.

QUARTZ.—*Visalia Delta*, Feb. 20: J. F. McKemie, one of the owners in the Coronado quartz mine, situated on the south fork of the Kaweah river, has just returned from the mine bringing with him some fine specimens of quartz. He showed us one piece of ore weighing nearly 40 pounds that was nearly pure sulphurets, bearing both gold and silver. The owners have a blacksmith shop and plenty of tools on the ground ready to commence work. J. C. Swickard, the superintendent, will start to the mine from Visalia with a supply of provisions, men, etc., as soon as the weather will permit. Mr. Swickard says they have thousands of tons of as good rock as McKemie brought down.

NEVADA.

Washoe District.

OPHIR.—*Superintendent's Report*, March 1: On the 1300-foot level from the end of the east crosscut from the shaft station a south drift is advanced 420 feet from the end of the east crosscut, continuing in porphyry and quartz showing some value.

CON. CALIFORNIA AND VIRGINIA.—The 1300, 1435, 1500 and 1600-foot levels continue to yield the usual quantity of ore. On the 1200-foot level the south drift is extended 70 feet. On the 1650-foot level the raise above the end of the east crosscut from the end of the north drift from the winze sunk 60 feet below the end of the south drift is carried up 60 feet and has been connected with the east crosscut on this level. We are stopping ore from this raise 20 feet below the point of connection. Owing to the snow blockade on the Virginia and Truckee railroad, ore shipments to the Eureka and Morgan mills were suspended and the mine closed down for two days, as the ore-house bins were full. We have resumed operations in the mine and ore trains are running regularly. We shipped to the Morgan mill 707 tons and 440 pounds of ore, and to the Eureka 992 tons and 1000 pounds, battery sample assays showing an average value of \$26.10 per ton.

IMPERIAL.—On the 300-foot level west crosscut, No. 2 continues in porphyry and quartz. The 500-foot level west crosscut is still in quartz. The 300-foot level north drift is out 1420 feet from the Yellow Jacket shaft.

OVERMAN.—We shipped 87 tons of ore during the week, battery sample assays showing a value of \$15.54 per ton.

SAVAGE.—We shipped 445 tons of ore, showing an average value of \$24 by battery sample assays. Bullion is on hand to the estimated value of \$22.

684.80. A 300-foot level south drift is being advanced from the top of the raise above the 400-foot level.

HALE AND NORCROSS.—We shipped during the week 735 tons of ore. The 300-foot level east crosscut has reached the hanging-wall. A raise above the 600-foot level at the Savage line is showing fair-grade ore.

CHOLLAR.—The Nevada mill stamps were hung up Thursday, on account of an accident to the supply flume. The mill will resume crushing ore to-night.

POTOST.—The raise above the 930-foot level is showing ore in the top assaying from \$25 to \$30 per ton.

OCCIDENTAL CON.—We continue to extract ore of good quality from the slopes on the 400 and 450-foot levels. The raise 100 feet south of No. 3 raise is up 42 feet, and continues in fair-quality ore. The 550-foot line, east crosscut, is advanced 11 feet in porphyry and clay. A south drift from the end of the line, west crosscut, is extended 7 feet in porphyry and pay ore.

SEG. BELCHER.—The 1200-foot level north drift from the winze is cutting ore of fair grade.

JUSTICE.—During the week we crushed 200 tons of ore, battery sample assays averaging \$30.82 per ton.

ALTA.—We crushed 325 tons of ore during the week, battery samples showing an average assay value of \$25.50 per ton.

Eureka District.

TRANSPORTATION OF PRODUCTS.—Eureka Sentinel, March 1: During the month of January the E. & P. R. R. Co. shipped over their road 194,820 pounds of ore from the mines of this district, and 210,000 pounds of lead from the Eureka Con. reduction works. During February they shipped 512,708 pounds of ore. There are 15 carsloads at the depot ready for shipment, and there would be considerable more but for the want of sacks, which are very slow coming in. The canyon roads are still filled with snow, and hauling over most of them is retarded. The roads to the Hamburg and Dunderberg mines have not been opened for the season. For these reasons the ore shipments have been very light for the past two months. During the present month (March) the ore shipments will doubtless be greatly increased, and we expect that there will be more ore shipped over the railroad alone this year than the entire production of 1889 amounted to.

DIAMOND ORE.—The Diamond mine on Prospect mountain has yielded well, even with the small force of men employed there during the winter. Charley Broy has been hauling as steadily as the head state of the roads permitted, and last Wednesday night he put on an extra team to sled the ore from the mouth of Goodwin canyon to the railroad depot. He will continue running both day and night as long as sledding remains good. From 8000 to 10,000 sacks of Diamond ore have accumulated at the depot and mouth of the canyon, which will be shipped to Salt Lake as rapidly as possible.

Pioche District.

STARTED UP.—Pioche Record, Feb. 22: The concentrators at the reduction works started up Tuesday afternoon and are running along smoothly. They are running on Half Moon ore and the concentrates are of a high grade. There is enough ore on hand to keep the concentrators running steadily until the company commences hauling ore from the Half Moon.

Robinson District.

MINES BONDED.—White Pine News, Feb. 22: J. N. Hodges and E. K. Walbridge of Pittsburg, Kansas, have this week taken the initial steps toward securing some valuable mining property in Robinson District. The following papers have been filed by them in the Recorder's office: Watson & Brown bond to Hodges & Walbridge the Rob Roy and Little Bonanza mines for \$50,000. Conditions: First payment, March 1st, \$10,000; April 1st, \$10,000; May 1st, \$5,000; June 1st, \$10,000; and August 1st, \$33,000. Watson & Brown bond to Hodges & Walbridge the Nieta, Carl, Comstock and Exchange mines. Agreement bond—\$5000 to be paid June 1st for 6-10 interest in said mines, the bonding parties to have a ten-stamp mill completed on one of the said mines on July 1st and to own a 6-10 interest in the same, the other 4-10 to belong to Watson & Brown. W. R. Thomas bonds to Hodges & Walbridge the Mohawk and Robust mines for \$24,000. Conditions: May 1st, \$10,000; June 1st, \$3,000; July 1st and August 1st, \$10,000 each. The same parties have bonded the Golden Revenue and Red Hill mines from R. M. Peters and J. B. Simpson for \$5,000, to run until June 1st. The Ely Gold Mining and Milling Co. have also bonded several mines and their leased mill and water rights to Messrs. Hodges & Walbridge for \$65,000. The other conditions of the bond we did not learn. While the Kansas party has got hold of some very valuable mining property, it is by no means the pick of the camp, and others who wish to look over the district can find equally as promising ground outside of the Big Joanna Bonanza.

Taylor District.

FAVORABLE.—White Pine News, Feb. 22: Wm. Read, superintendent of the Eberhardt-Monitor mines, was in Ely Thursday. He informs us that the prospects of the company the coming season are very favorable.

Tuscarora District.

NEVADA QUEEN.—Times-Review, Feb. 28: North gangway from the 600-foot level station has advanced 22 feet. The flow of water continues, and has stopped the overflow from the winze on the 400-foot level.

NORTH BELLE ISLE.—South drift from station crosscut, 300-foot level, extended 16 feet. South intermediate, above same level, extended seven feet and connected with No. 4 chute. Have started to follow the main portion of the vein, which is found to be in the hanging-wall in front of the stopes at No. 4 chute. North gangway from the 600-foot level extended 22 feet. The quality of the ore in the face is improving very fast.

BELLE ISLE.—The crosscut from the 350-foot level extended 12 feet; rock very hard in the face with strong flow of water.

NAVAYO.—Air connection has been made with the raise from the 150-foot level and good ventilation will now facilitate prospecting at this point. No. 2 crosscut, 350-foot level, extended nine feet, showing spar seams giving low assays.

NORTH COMMONWEALTH.—1st level: North

drift from No. 1 crosscut is in 13 feet, exposing high-grade ore three feet thick. South drift from joint crosscut has been run 14 feet, and is developing a fine body of rich ore; average assay from car samples \$383.07 per ton. 2d level: Joint crosscut advanced 19 feet through the same formation as on the 100-foot level before reaching the ore.

GRAND PRIZE.—400-foot level: Face of north crosscut advanced 10 feet, cutting stringers of ore.

DEL MONTE.—1st level: North drift from No. 2 crosscut extended eight feet showing good ore very near hill size of drift. North drift from joint crosscut extended nine feet; face continues all in good ore; average assay car sample, \$287. Drift does not take all the ore, as it shows on both sides. 2d level: Joint crosscut extended 10 feet, cutting small seams of spar and pyrites. 3d level: North drift from joint crosscut advanced 11 feet through low-grade ore, with slight flow of water.

COMMONWEALTH.—1st level: East drift from No. 1 north drift has been extended 8 feet; ore 2 feet thick; getting wider as the drift is advanced. 4th level: North gangway extended 15 feet without change; north drift from south gangway has been run in 10 feet, face being all in ore, some of which is high grade, average of first-class \$326.89 per ton. The stopes throughout the mine continue to look well. Hoisted during the week 950 tons of ore, all of which has been sent to mill and concentrating plant. Average battery assay at the mill \$250.63 per ton; average at concentrators \$17.85 per ton. Billion shipment for the week, \$48,788.11. Everything working well.

ARIZONA.

NEARLY FINISHED.—Mohave Miner, March 1: The Atlantic Mining Company's mill, Wallapai mountains, is nearing completion. John Sandoval is taking out some good ore from his claim near the C. O. D. mine. Jack Thomas and M. W. Harvey are taking good ore from the Prince George north, Stockton Hill. Tom McMahon will soon make a shipment of high-grade ore from the Prince George south, Stockton Hill. Work is progressing steadily at the Green Linnet mine, Union Basin. It will not be a great while before a mill will be erected. J. M. Owen has made a discovery at the head of Crow canyon, in Cedar district, which promises to prove valuable. The croppings are very rich in horn silver. W. W. Clark and S. A. Tyler, lessees at the C. O. D., have ready for shipment 180 sacks of ore, which is of good grade, besides a carload to assort. They have a nice bunch of ore in sight in the mine, which they will lose no time in extracting. The Kingman Sampling Co. intend to build new works west of the water tank, opposite the Arizona Sampling Works. The present ore floors are entirely too small to handle the large quantities of ore coming to them. The new works will possess a larger crusher and be driven by steam. E. F. Thompson has a force of eight men employed in the Empire No. 2, Chloride. There is opened a block of ground 100x50 which will be immediately stope, and as the ore body is 1½ to 4 feet in width, large and regular shipments are expected from this property. Steve Hinkle made a shipment last week from his Retort mine, Mineral Park, which worked nearly 400 ounces silver per ton. The last two years Mr. Hinkle has spent in the southern part of the Territory, but about two months ago he returned to Mohave county, and considers it the best mineral belt in the Territory.

COLORADO.

RED ELEPHANT.—Georgetown Courier, Feb. 27: The Red Elephant mine is reported to be again in bonanza. A foot of \$500 ore has been struck in the lower level on the Swartz shaft. Mr. Daily, the superintendent, whom fortune has favored in all his mining undertakings, is, we understand, the principal lessee in developing the ground in which the strike was made.

LESSEES.—Three sets of lessees are operating on the Burrell, each making about \$5 a day to the man. The last millrun by Simmons & Stanton returned 3 4-10 ozs. gold, 45 ozs. silver per ton and 7 per cent copper. Dan Forrest's lease opened out into an 8-inch streak of solid mineral last week. The company continues sinking the shaft, which is now about 150 feet deep.

OIL.—A Pittsburg syndicate is leasing the land about Morrison, Jefferson county, for a long term of years, for the purpose of sinking oil wells. It has long been supposed that oil can be found in paying quantities, as frequently the sandstone is thoroughly saturated with petroleum. It is the intention of the syndicate to commence sinking several wells as soon as the land is secured, and if necessary, go to the depth of 3000 feet.

DEMOCRAT MOUNTAIN, which has long been in the slough of the dumps, is beginning to cheer up the hearts of the miners who have staid by its mines through the years of depression. Sheets & Co., who have been pegging away for three years with but one small pocket of ore during that time which paid for their salt, are making large shipments of an excellent grade of ore. L. E. Davis on the Silver Glance, is also in good ore, and has had several excellent runs. The tide which has been against P. McNulty for these many years is beginning to turn, and the Fred Rogers bids fair to come to the front again.

DAKOTA.

CHLORINATION.—Deadwood Pioneer, Feb. 26: It has been practically demonstrated that the Black Hills refractory gold ores can be successfully and economically treated by a process of chlorination. This was proven to the satisfaction of every one interested by operations last fall at Keith's Garden City plant. Col. Carpenter's works are just completed in this city, and not later than March 1st will be in full operation on ore from the Golden Reward mine, Bald mountain. Col. Carpenter does not claim, nor does he expect to be able, to save what silver the ores may contain. He does calculate, however, on saving from 85 to 90 per cent of the gold assay value of the rock treated. The process to be applied is that covered by the Newberry-Vautin patents.

IDAHO.

TWO BIG DISCOVERIES.—Elmore Bulletin, Feb. 22: The crowning event of the week has been the

rich discoveries made in the Republic and the Lost Lode mines. Eugene Lison, the owner of the Republic lode claim, the eastern extension of the Ophir, has encountered in the crosscut recently driven, about six feet of \$100 rock. The vein is well defined and gives every evidence of permanency. This, together with the developments on the western extension of the Ophir, prove beyond a doubt the absolute continuity of the vein for at least 4000 feet. The owners of the Lost Lode, the western extension of the Queen Bess mine, have also abundant cause for rejoicing. Ten feet of \$30 ore he voluntarily swears to, and with slight urging very readily increases the width of the lode to 15 feet, and the value of the quartz in proportion. The owners of the Queen Bess naturally feel much elated over Patterson's success, and it is in truth a cause for mutual congratulations. The reward for pluck and hard work in the above instances is well merited, and these new discoveries will help to swell the mining boom that is sure to strike Rocky Bar early in the coming summer.

STRIKE IN THE GOLD HILL.—D. R. Dealy, foreman of the Gold Hill mine, owned by the Pine Grove Mining Co. of St. Louis, writes a few lines to the Bulletin saying that they had cut a big and rich ledge in the lower tunnel of the Gold Hill, at a depth of 500 feet. It is four feet wide and all high-grade ore, running from \$100 upward to the ton. Mr. Dealy thinks the point where they made this strike is nearly underneath the shaft sunk last winter. The Pine Grove Co. allowed its mill and mines to be sold for taxes (subject to redemption of course) and since then attachments to the extent of \$2581.25 for labor, have been placed upon the property. This recent development will doubtless cause the owners of the mine and mill to redeem the property sold for taxes, pay off their laborers and make a new start for the hidden wealth in their claims.

CEUR D'ALENE.—Wardner News, Feb. 22: It is pleasing to note the many marks of preparation visible on every side for the active campaign of the coming season. Ceur d'Alene will be a little world of itself, eagerly sought for by ambitious travelers. Aside from the continued and increased development of our present producing mines, others will come to sight in rapid succession instituting a pleasing rivalry with their older neighbors. Ponderous machinery will be brought from all directions over our lines of travel and all the necessary and modern appliances will be introduced in all our working mines, electric lights will constitute one of the many improvements, and the new drill, operated by electricity, will be added to the prospector's outfit, as the power to operate it can be carried easily and inexpensively to all points where its service is required. Numbers of hoisting plants are already ordered and the building of concentrators will commence with the opening of spring. The dam of the Bunker Hill & Sullivan Mining Co., at the mouth of Elk creek, was finished on Thursday. A small force of men is still working on the flume.

LOWER CALIFORNIA.

ALAMO.—Lower Californian, Feb. 28: A complete Wiswell quartz mill arrived on the Newbern yesterday from San Francisco for W. S. Kerr and son, of Alamo. Col. Lucas is about to start up his mill in Mexican Gulch on 200 tons of ore from the Centipede, Visnagre, Bennett's Granite Mountain mine, and Nuestra Señora de Guadalupe mine. They are all located in the Gulch and are said to be good properties. Most of the mines at Mexican and American Gulches have been neglected in consequence of the rich inducements offered at Alamo. But Mexican Gulch is all right and some good reports can be expected from there. The big pump for the El Paso Company has arrived and will be put to work on the El Paso mine. This company's mill is running steadily and must be turning out considerable gold. Thirteen tons of ore from the Aurora mine, run through Lane's mill the other day, yielded \$500. Lane's mill has been grinding on rock from the Aurora mine, of which Postmaster Gonzalez is superintendent and part owner. Many of the boys are sailing close to the wind these days, with bacon, beans and flour. Potatoes are away up to 10 cents a pound. It costs you 50 cents to handle a pound of salt junk or bacon. Hay is \$100 a ton, and tallow, three pounds for a dollar. Crackers, three pounds for a dollar. Eggs, 75 cents a dozen. Flour and fresh beef are the cheapest things in the camp. Competition has reduced the price of flour to \$8 per 100 pounds for best Ensenada, and \$7 for No. 1 Ryerson.

MONTANA.

THE MOODY AND SANKEY.—Inter-Mountain, Feb. 27: The extension of the bond on the Moody, Sankey, Kossuth and Iowa claims, in the Independence district, is an extension of six months on the original bond. These properties are being developed under bond by a St. Louis syndicate, under charge of Major B. J. Fine. There are three veins on the properties, the Sankey vein on the south, the Moody vein in the middle and the Kossuth vein on the north. An excellent surface equipment was purchased and put up and the machinery is capable of sinking the shaft to the depth of 600 feet. Sinking was begun on the Moody vein and this shaft is now 225 feet deep. The ledge varied all the way from 6 to 12 feet of excellent ore. At the depth mentioned, a crosscut was started north to develop the Kossuth vein. This crosscut has now progressed 155 feet and it will be necessary for it to go 200 feet further before striking the vein. This makes a long crosscut, but it is cheaper than to sink on the Kossuth vein. When this development is finished a second crosscut will be run south to catch the Sankey vein. This crosscut will be about 80 feet in length when finished. This development of the Moody & Sankey group of mines has proceeded in a very permanent and conservative manner. The shaft is a two compartment, 4½ by 8 feet in the clear, and the parties have expended \$18,000 on the property since the first of last August.

THE CAMP OF CHAMPION.—Anaconda Review, Feb. 20: Champion is the camp of Oro Fino district, and is assuming proportions that would satisfy any one of its permanency. The buildings planned for the future are to be modern structures of the most substantial and imposing styles. There are hundreds of good prospects, many of which are being vigorously developed. In nearly every case

where any depth is reached, ore in large or small quantities is found. The mines that have a depth of 250 feet are paying, which is evidence sufficient that deep mining is the character of the camp. Eleven steam hoists are in operation near Champion, and the forces at work are being enlarged.

NEW MEXICO.

AZTEC.—Southwest Sentinel, Feb. 25: Recently a big strike was made in the Kleptomani vein on the Aztec property at Pinos Altos. The ore is very rich and will yield between \$13,000 and \$15,000 per ton. About one ton has been taken out and there is considerable more in sight. Yesterday there was a cleanup at the Aztec mill after 41 hours run. Twenty tons of concentrate worth \$63 net per ton, and about two ounces of gold for each ton of ore was saved. Sam Green, a milman of much experience, says it is the best cleanup he ever saw in New Mexico. Another good brick was brought in this week from the Little Fannie mine in the Mogollons and shipped to the San Francisco mint.

GREYBACK GULCH.—Kingston Shaft, Feb. 22: Accompanied by Mr. Wm. Harris and A. W. Farrington, last Monday, a representative of the Shaft visited the Animas Peak mining district, in search of "strikes" and the rumors thereof. After passing through Hillsborough we wended our way across the hill to Greyback gulch, about six miles north-east of our county capital, and up said gulch to the foot of Black Peak, where we were agreeably surprised to find a lively little camp; prospectors and miners all in good spirits. W. H. McDonald is interested with Mr. J. H. Crane and others in several good properties. By invitation of Mr. J. T. Clark we visited the Chance mine, owned by Mr. Clark, J. W. Brooks and others, from which they are taking out and sacking ore assaying from \$250 to \$800 in gold per ton; the lead being exposed in several places for a distance of 1500 feet, and showing pay ore wherever exposed. We were shown some very fine ore by Mr. N. R. Watkins, taken from his Monarch and Blind Tiger claims. These properties lie in the vicinity of the well-known O'Kelly mine. Plenty of water is found in Greyback gulch at a depth of 10 or 15 feet from the surface. Messrs. Woolsey and Farrington own the west extension of the Chance lode, and have done considerable work, which shows up well. They have several tons of ore on the dump, which will give returns of \$20 and upward per ton in gold.

UTAH.

A BOOM.—Salt Lake Tribune, March 1: "Yes, we're going to have a boom in the mining business this spring," said a leading broker yesterday, "and if it wasn't that the snow is fighting for existence so stoutly and so unusually, it would have started before this. For example, I have a number of properties on the market, and although I say it, they are good ones. At the same time I have a number of intending purchasers from the East, and one of them has been patiently waiting here for nearly six weeks to get a chance to see the claims he is willing to buy if they are as good as represented. Once the snow flies—flies away—business will boom." "You might say for one thing," said another gentleman, well versed in the mining industry of Utah, "that in the search for wealth, the hills in the immediate vicinity of this city have never received a fair show. A little prospecting has been done, and a little ore occasionally finds its way to market, but it has been done in a half-hearted sort of way. I have no doubt that a systematic examination would be a paying investment for any one that would go into the business." "The snow blockades we have had tend to keep back ore shipments, and of course trade is a little dull," observed a gentleman connected with one of the assay offices of this city; "but there is one good thing you may report to-day—lead is advancing. It is quoted at \$3.85, as against \$3.75. Heavy shippers can do well at either of those quotations, but the smaller operators have to hustle when it drops below \$4." "Talking about new properties," said another broker, "there are half a dozen going on the market this spring. They will all be worked by stock companies, and include coal, iron, gypsum, lead, lime, the latter to be taken from a marble that will give 95.2 per cent of a pure carbonate of lime. Oh, yes, business will boom, and there are more millions of money in the rocks of Utah than its best friends ever dreamed of, or could even count."

CLOSED DOWN.—Park Record, March 1: Yesterday work was suspended on the Comstock property, situated up Thayne's canyon. However, the suspension of work will be only temporary, or until the winter breaks up and permits the proposed hoisting works to be erected. The character and permanency of the vein have been definitely established, and when the company gets to operating at depth, great results are confidently looked for.

CAMP CROSSCUTS.—Comparatively few mining claim locations have been made since the middle of January. Leaser Thackwell will resume development on the Park City Mining Co's group as soon as the weather permits. White & Thackwell have secured a lease and bond on a desirable piece of ground situated on the course of the Woodside lead. A whim is being put up over the Silver King shaft, up Woodside gulch, and developments will now go ahead with greater vigor. J. H. Steele is working a few men on his property below town and expects to increase the force considerably as soon as the weather moderates. A small force of men is kept at work by the leasers on the Nevada-Northland, and a big lot of high-grade ore is on the dump for shipment. Smith Ehenger is pushing work on the Rosebud property, in the near vicinity of the Anchor. Developments in the face of the tunnel and also in the main crosscut are of a very favorable nature.

ORE AND BULLION SHIPMENTS.—The Ontario made a big shipment of ore this week to the sampler. No bullion or sulphides were shipped from the Marsac mill this week. The Ontario bullion product for the week was 46 bars, containing 30,955.67 fine ounces of silver. Gitsch & Campbell's shipment of ore from the Crescent's upper or leased workings for the month of February amounted to about 150 tons, being lot No. 2.

For the week just ended the Mackintosh sampler received and forwarded 948,430 pounds of Ontario ore; 280,260 of Daly; 144,350 of May Flower, No. 7, leasers, and 80,750 pounds of Woodside ore; total, 1,453,790 pounds.

MECHANICAL PROGRESS.

The Manufacture of Steel Direct from the Ore.

An invention for the production of steel direct from the ore by one continuous heat, for which a number of United States patents have recently been granted, promises to revolutionize the manufacture of iron and steel and attract wide attention; also to prove an important factor in the development of the resources of the South. The claims made for this new process are that by one and the same heat, and by a continuous process, steel for mechanical and structural purposes can be made at a very material reduction from present cost of manufacture, and that by this method phosphorus iron ores can be utilized for the manufacture of every grade of steel as readily as high-grade Bessemer ores. The inventor, Col. William F. Mason McCarty, a well-known engineer chemist, has spent many years in perfecting this process, and it is claimed has, by practical tests, proven and demonstrated its entire success.

The process is one founded on well-known chemical and physical principles for reducing ores to metal at a minimum cost. The special mode of treatment of the ores is such that by it the phosphorus and sulphur, the silica and titanium, are, it is said, entirely eliminated. By the form of furnace used in this process, the metal undergoes not only a reduction but a mechanical puddling and compression equivalent to a hammer and compression of the metal, while the product, it is claimed, will be a superior metal for industrial, mechanical and structural purposes. By this method the reduction of ores to metal requires that the ores first be finely pulverized; they are then placed in the roaster over the top of the furnace proper, through which passes all the wasted heat of the furnace, roasting out all the excess of sulphur contained in the ores, and this before they reach the furnace fire proper. The ores and flux, thus intimately mixed, pass into the body of the furnace; there they are again mixed with the finely pulverized coal or coke, or the carbonaceous matter to be used (when it has been decided to use the solid fuel), and exposed to the destructive action of the ascending flames from below, and from the moment they enter the furnace every particle of the finely divided ores and flux is exposed to the calorific action of the fuel in falling from shelf to shelf of the furnace.

The impurities, such as phosphorus and sulphur, leave the metal at the moment of fusion. The chemical affinity of these impurities having had their molecular balance disturbed by the excessive heat, immediately combine with the basic flux, leaving the metal in a state of purity not heretofore obtained by any other process.

At the moment of fusion, the metal by its gravity falls from shelf to shelf, exposed to the action of the flame, turning each and every time a new surface to the reducing energy of the flame, receiving a mechanical puddling and burning out the excess of the silica or any trace of phosphorus or sulphur yet remaining, after which they are withdrawn into the lower hosh of the furnace.

Here, the air-blowing and burning out of silicates and carbon are completed, when the metal undergoes the carbonizing process and is given the required amount of carbon for the purpose to which it is to be applied. The molten metal is now conveyed into a heated vacuum chamber, where all the occluded gases are withdrawn by the vacuum maintained in a large receiver, connected by hydraulic piping immersed in water for condensation of the heat of the gases, thus rendering the metal a solid, homogeneous mass of the same quality throughout, "a hammered steel in molecular structure." The ingots and castings are one mass alike in structure—solid, free from blow-holes, and of a fine, fibrous structure, particularly fitting it for industrial and mechanical use, for ordnance, armor plates, etc.

The value of gas as a reducing agent is acknowledged by all, but heretofore no one has devised a practical form of furnace to utilize the whole calorific energy of the fuel. By this system all the heat units of the fuel render a *quid pro quo* for cost, and all the heat is utilized in some portion of the process.

The purification of the metal begins with the roasting, and once an atom of sulphur or phosphorus leaves the metal, it is taken up and firmly bound by the basic flux. The simple fact of reducing the ores to a finely divided state allows a more equal distribution of heat, hence an economy of fuel, and while in this state mixed intimately with the flux at the moment of fusion, when the molecular balance of the ore is disturbed and the impurities of phosphorus and sulphur set free, the highly heated flux having a reactive affinity for them, takes up and holds them in a slag.—*Manufacturers' Record*.

THE SUBSTITUTION OF IRON OR STEEL FOR MACHINERY is rapidly gaining ground. It is poor economy to use wood in any piece of machinery—mill machinery especially—when it is possible to substitute metal. The *American Miller*, in speaking of this matter, says: "Suppose you erect a building as nearly fire-proof as your means and experience will permit, and then apply to an insurance company to give you a rate on it. You will not have much to com-

plain of; the insurance folks will charge you a premium that is almost nominal compared with that charged for ordinary manufacturing risks. Then fill the building up with roller-mills, smelters, purifiers, reels and elevator legs, and start them all in motion. Make another application for insurance, and you will be astonished a second time; not, however, at the cheapness of the insurance, but at the steepness of it. There are a good many fire-proof buildings that are not fire-proof after they are occupied, so combustible are the ordinary implements and belongings of life. The risk in the case just cited is twofold—the risk of machinery in motion and the combustible character of the machines used. Against the risk of running machinery there is little to provide, except to cause a dearth of material on which an incipient blaze may feed. But the machines themselves could be greatly improved from a fire-hazard standpoint by the substitution of metal for wood. There are fashions in machinery, and, unfortunately, from time immemorial, wood has been the fashion in flour-mills. But now metal, and especially steel, is becoming so cheap that wood should be supplanted. Let the next man who brings out a milling machine get figures on the relative cost and weight of a steel and hard-wood frame. We doubt if some machinery-builders know how greatly cheapened steel has become in the past two or three years. It is the cheapest thing in the world of manufactured goods to-day, and ought soon to take its rightful place as the common implement of industry. We are living in a veritable age of steel, though but few have realized the full import of the fact."

IRON BUILDINGS MADE EARTHQUAKE PROOF. A cathedral is in process of construction at Manila the materials of which will be almost wholly boiler and cast iron. The design is original, with two tall steeples at the front end and a number of short spires over each apse. When finished, it will be palatial in imitation of stone. Inside, the church is 162 feet long by 70 wide; the height to the tops of the arches is 52 feet. There are two towers, 19 feet square and 170 feet high from the ground to the top of the mid-vane. The walls are of double plate iron, with a space of 30 inches between the plates. The decorative work is of cast iron. The total weight of iron in the building is 1600 tons. The whole is so completely tied and bound together that it is considered absolutely earthquake-proof. It is probable that similar structures will be erected not only in Manila, but in the various cities and towns of the Philippine Archipelago, and there is no apparent reason why the architectural iron manufacturers of the United States should not supply the material for them, or why such buildings might not be put up on this coast. The expense is said to be but little if any more than is involved in stone or brick.

AMERICAN MINING MACHINERY TO BE MADE IN ENGLAND.—Frazer & Chalmers of Chicago, probably the largest manufacturers of mining machinery in the world, are about to erect a large establishment in England for the purpose of manufacturing their machinery in that country. It is said that the business of this firm now reaches about \$3,000,000 a year, making it almost impossible to handle it from one distributing point. They make shipments to Europe, Australia, Asia and Africa, and have heretofore been compelled to ship to London, and from there to the various destinations of the consignments. Hence they have decided to establish a branch in England, near London, where they will manufacture and ship direct, without the additional trouble and expense of reshipment of American machinery, which they are at present compelled to undergo. David S. Frazer will go to England to superintend the erection of the works. This movement has given rise to a report that an English syndicate has bought out their Chicago plant.

STEEL FOR SHIPBUILDING.—Steel may now be considered as the material of which ships are built, and the steady progress made in the adoption of this metal, on the Clyde at least, is shown by the fact that, whereas in 1879 the percentage of steel to the total tonnage was only about 10½, last year it was no less than 97.2 of the whole. In a year witnessing such a rise in price of steel and iron as 1889, this has had a decided effect on the cost of shipbuilding, and compared with 1888, prices of vessels have shown an advance of 45 per cent in some instances, with a smaller but considerable advance in others. Even then the profits of shipbuilders are considered to have ruled comparatively small, the workmen, on the contrary, having by reason of the great demand for their services secured a handsome rise in their rate of wages, and felt the full influence of the improvement in their trade.

TAKES THE BELT.—A mammoth belt, probably the largest in the world, has recently been manufactured by the Munsion Belting Co. of Chicago for the Brush Electric Co. of Minneapolis, Minnesota. The belt is 68 inches wide, 126 feet in length, and weighs 1600 pounds. It is a perfectly rivetless belt, that company holding to the opinion that the material of riveted belts is greatly weakened by the rivets. Their belts are cemented, and in finishing are made to pass between rollers having 250 tons' pressure.

KID GLOVES just being shown as the newest are said to be made of colt-skin.

SCIENTIFIC PROGRESS.

The Eye.

The eye, whether of man, animal or insect, is one of the most wonderful things in nature. Between man and the insect its forms and modifications are great and varied. Of course in man this member is the most perfectly developed; yet there is good reason to believe that its present degree of perfection has been reached only by successive developments or evolutions. There is a good degree of evidence for the belief that the eye of man, even at a comparatively recent period,

Could Distinguish Only Two Colors—Black and Red.

Science gives us interesting details about what the human eye has been and what it may become. The Vedas of India, which are the most ancient written documents, says a late writer, attest that at times most remote, but still recorded in history, only two colors were known—black and red. A very long time elapsed before the eye could perceive the color yellow, and a still longer time before green could be distinguished; and it is remarkable that in the most ancient language the term designated yellow was sensibly passed to the signification of green. The Greeks had, according to the generally received opinion, the perception of colors very highly developed, and yet authors of a more recent date assure us that as late as the time of Alexander the Great the Greek painters knew but four colors, viz., white, black, red and yellow.

The very words to designate blue and violet were wanting to the Greeks in the most ancient times of their history, they calling these colors gray and black. It is thus that the colors in the rainbow were only distinguished gradually and the great Aristotle only knew four of them. It is a well-known fact that when the colors of the prism are photographed there remains outside the limit of the blue and violet in the spectrum a distinct impression which our eyes do not recognize as a color. Physiologists tell us that it is reasonable to suppose that as the color organ becomes more highly developed, and even before the human eye becomes perfect, this outside band will evolve into a color perfectly discernible.

A late writer in *Popular Science News* says: "It is a generally accepted theory that what are called the 'rods and cones' in the human eye are the true organs with which we distinguish colors. These organs are wanting in many animals, as, for instance, they are wanting in the eyes of sharks and roachas among the fishes, and in hedgehogs, moles and bats among mammals, so that if the analogy holds good, these animals can have no sense of color. Among birds, the owl is but scantily supplied with rods and cones, while birds of prey which fly by daylight, as gulls do, are more plentifully endowed with them. Through examination of the human eye and the way in which it perceives color, it has been concluded that to frogs the whole world they see is yellow, while to certain birds the entire visible creation must seem red—the sky, the sun, the flowers, all, in short, that comes within the range of their vision is red, because the construction of their eyes permits of the perception of no other color. To them the world must appear as it does to us when we look through a piece of red glass. This train of thought could be carried much further."

Electro-Magnetic Disturbances.

It is well known that electro-magnetic disturbances on the Pacific Coast have occurred simultaneously with certain sun disturbances observed through the telescope. Evidently the electro-magnetic force must have traveled from the sun to the earth with the velocity of light. Twenty years ago Clerk Maxwell asserted that light was an electro-magnetic wave movement. Following out his suggestion, an interesting series of experiments has recently been made by Prof. Hertz of Brown University at Providence, Rhode Island, which show that electro-dynamic force is, like light, a wave motion, propagated through ether, and like light subject to reflection, refraction, and concentration by means of lenses. Prof. Hertz's experiments were based on the variations of an induction current at various distances from a metal wall, reflecting the primary current; based, in fact, on the well-known phenomena of wave interference, and they show the length of an electro-dynamic ether wave to be 1.72 m., its velocity through space to be 300,000 m. per second, or identical with that of light. By means of a metal reflector, electro-dynamic waves were focused, some substances, such as wood, being transparent; others, such as metal, being opaque, and casting electro-dynamic shadows. A huge prism of tar, weighing 1200 pounds, showed that the laws of refraction are analogous to those of light. Almost infinitesimally short vibrations of ether manifest themselves to us as chemical action, longer ones as light, still longer waves as heat, and these very long waves as electro-dynamic force. Electro-dynamic force is the low and foundational base of which light and heat and chemical action are the high tresses.

A NEW COMPOSITE METAL.—Schmiedharen-gass is the inconveniently long name given to a new composite metal for which almost marvelous properties are claimed. It is composed of

pig iron, wrought iron, copper, an aluminum bronze alloy and a flux. It is produced direct from the ore without annealing, yet it can be welded and hammered like iron or steel, and can be manufactured, it is claimed, at a less cost than malleable iron or steel castings. At a test made Jan. 20th in Louisville, Kentucky, it is said to have endured a tensile strain of 168,000 pounds per square inch, that being the limit of that machine. The new composition is the discovery of Mr. Hatzfeldt of Newport, Ky., who has made many experiments in producing aluminum.

MAGNETISM OR ADHESION.—At frequently recurring intervals the daily press make announcements of the alleged wonderful "magnetic" qualities exhibited by certain individuals, who are able to make various substances adhere to their hands without exerting any muscular pressure upon them. The miscellaneous nature of the bodies which are embraced in the list of such adherents, embracing wood, glass, etc., would at once dispel the theory that magnetism, either "personal" or otherwise, had anything to do with the phenomena, but they are so rarely investigated with the object of reaching their true cause that an instance of the latter deserves attention. Such investigation, says the *German Telegraph*, has been recently made by Dr. W. Simon of Baltimore, which proves pretty conclusively that causes other than magnetism must be assigned to the observed facts. The subject examined was able to maintain, by mere contact with the fingers, a weight of 2500 grammes; but it was shown that this power was exercised only to very smooth or highly-polished substances, glass being the most favorable in this respect. The cause assigned by Dr. Simon to account for the observed facts, and which is probably the correct one, is the well-known adhesion between two bodies brought into such close contact as to exclude the air between them, the pressure of the atmosphere acting to maintain the bodies in contact. It is, therefore, only a question of the smoothness of the skin which would appear to be the qualification necessary to enable any one to manifest "magnetic" properties.

WAR IN A DROP OF BLOOD.—Observations recently made in Italy in regard to the microbe of malaria show that at a certain period of its development this microscopic creature has enemies to fight in a globe of blood, and that in order to escape from them, it makes use of its flagella or whips with which it tries to beat off the inimical microbe that is bent on absorbing it, and generally ends by doing so. Here certainly is intelligent adaptation of means to ends; yet how different from ours must be the world that the malaria microbe finds within a drop of blood that runs within us. The universe appears to be as vast downward as it is upward.

RENDERING WOOD FIRE PROOF.—If we can depend upon the claims of a New England chemist, he has made a most wonderful and valuable discovery. This discovery consists of a cheap method of dissolving zinc by combining it with hydrogen, forming a solution called zinc water, which has the property of rendering wood, to which it has been applied, absolutely fire-proof. The cost of the material and the application is said to be very light, and the discovery will be of the greatest value to hotel and theater proprietors and the owners of all large buildings.

A CURIOUS CIRCUMSTANCE.—A curious circumstance is noted by the *Tampa (Fla.) News*: An orange grove near that place was abandoned a long time ago. The cars pass the grove, and it is said that the row of trees next the car track has a healthy, vigorous appearance, while all the trees beyond, with one exception, have a deathly pallor, which betokens early demise. Whether the thriftiness of the trees next the track is due to the trembling of the ground, caused by passing trains, or to the smoke from the engines, both or either, is a question.

RAPID FLYING OF DUCKS.—A canvas-back duck flies at an habitual rate of 80 miles per hour, which is increased in emergency to 120. The mallard has a flight of 48 miles an hour; the black duck, pin tail, widgeon and wood duck cannot do much better. The blue-wing and green-wing teal can do 100 miles an hour and take it easy. The red-head can fly all day at 90 miles per hour. The gadwall can do 90 miles. The flight of the wild goose is 100 miles per hour.

PRIZES FOR BIOLOGICAL STUDENTS.—Prof. C. A. Stephens of Norway Lake, Me., having come to the conclusion that the time has come to concentrate upon the one proper subject of biology, namely, the renovation and prolongation of human life, has offered three prizes, one of \$175, another of \$125, and a third of \$100 for the best three comparative demonstrations, by means of microscopical slides, of the blood capillaries in young and aged tissues, canine or human.

ADVERTISING ON THE CLOUDS.—According to the *Electric World*, a Western inventor is endeavoring to interest capital in his electrical magio lantern for casting or reflecting advertisements on the dark clouds that often hang low over a city. He claims to have secured contracts from several well-known firms for displaying their notices in this manner.

GOOD HEALTH.

The Germ Theory of Disease.

(By AMOS ADAMS.)

The wonderful and important revelations that have been made and are constantly being made with the microscope transcend, in their importance to the well-being of man, the discoveries of all the telescopes in Christendom, the monster Lick included.

Scientists and microscopists tell us the atmosphere we breathe is filled with

Living Organisms.

And that there are spores of them that are very dangerous to persons who inhale them, more especially if affected with catarrh, throat or lung difficulties.

We desire at this time to call your attention to the case of so many cases of sickness among those who attended the last meeting of the State Grange. For two weeks we have been a victim of the poisonous inhalations while there, and propose in this paper to have something to say about these unseen (to the naked eye) denizens of the air, that are so detrimental to the health of mankind.

Atmospheric Micrography

Is one of the latest sciences whose small beginnings do not date back more than three decades; but at present many scientists scattered over the civilized world are giving the best years of their lives in studying the character and habits of the bacilli in their manifold forms.

It is well known to all readers of the literature of the day that Dr. Pasteur, one of the greatest savants in all Europe, has spent many years in searching for the cause that produces hydrophobia. Dr. Gamellia of Odessa, with several confreres, is endeavoring to discover the germs that produce cholera. There are also a great number of physicians in nearly all parts of the world who are endeavoring to find the cause of consumption and other forms of tuberculosis, and with wonderful accord they have directed their investigations to the

Unseen Living Organisms of the Air.

And to these they ascribe the cause of most of the diseases that flesh is heir to.

At a meeting of the Academy of Sciences held in Paris in 1860, Dr. Pasteur read a paper explaining the comprehensive and intelligent system he had adopted in investigating, analyzing and classifying atmospheric germs. His investigation revealed many curious objects among the minute articles held in suspension in the air, among which are found grains of dust raised from the soil, carbonate and sulphates of lime, little globules of magnetic iron that have come into our atmosphere perhaps from infinite space, with other forms of inorganic matter. With these are found hutterflies' scales, the debris of dried insects, vegetable pollen, filaments of seaweed and other lifeless organic substances. Associated with this infinite variety of small particles are

Microbes of Different Species

Which have the ability to live by means of organic matter suspended in the air. The statement would be incredible, without the aid of a microscope, that living organisms, 1500 of which if collected would not be as large as the head of a pin, are living, thriving and fattening on other organisms, animate and inanimate, defying, or rather rising superior to, the laws of gravitation, and remaining at will suspended in the atmosphere we breathe.

Farmers living comparatively isolated from each other are bleasted with an atmosphere coming direct from Nature's great laboratory, purer and healthier than is found in cities; yet microbes, bacteria and other dangerous living organisms exist only in lesser quantities. Put vegetable mold under a powerful magnifying glass, and you will find it

A Mass of Living Organisms.

This mold or apparent dust is frequently found in furniture, also in wall-paper in rooms that have been closed up for some time. When the doors and windows to each room are first thrown open, permitting the vitiated air of the room to mingle with the pure atmosphere from without, an atmospheric condition is formed for microbes to propagate, at which times they are more dangerous to man. Therefore rooms should be well aired and kept clean by frequent dusting before being used. These remarks will apply with equal force to churches, to assembly-rooms, to Grange halls, or to rooms in dwelling-houses.

We remember, during our attendance at Grange meetings in this hall, that we were the first one to enter it after the door was unlocked, and we found the atmosphere in it dense and heavy—exactly the place for myriads of microbes to congregate, and it only required the vitalizing atmosphere that soon came in at the door to arouse them from their dormant conditions and send them out on their deadly errands. These conditions are often brought about at our State Grange meetings, where three or four hundred human beings are densely packed. With the animal heat and the natural emanations thrown off from the human body, with doors, windows and window blinds tightly closed by some timid member who is in constant terror lest some person on the balcony on the opposite side of the street should look in and find that at some stage of our work the candidates were or were not blindfolded—with

these conditions the atmosphere in the hall soon becomes

Ton Ville for Description.

And of course dangerous to health. It is at such times, with the little pure air working its way through the door that is occasionally opened, that the deadly microbes begin their work. This they do by attaching themselves to the weaker parts of the human body; for instance, if one is troubled with nasal catarrh, they will gather in large numbers in the nose and head. If the throat, bronchial tubes or lungs are sore or weak, they will soon settle themselves to those parts, and persons thus afflicted will find themselves trying to expel these uncanny tenants by clearing the nose, by coughing or by expectoration, wondering at the same time how in the world they caught such a cold, when in fact

It is no Cold at All.

But the presence of the bacteria in some of its manifold forms. It is said that microbes differ from most expressions of life in this, that in the process of propagation they do not have to come in contact with the opposite sex; some varieties seem to crumble to pieces at will; each piece or fragment is endowed with life. Other varieties seem to be joined or more like buttons placed on a string, and when desirable the string is broken and each section goes immediately to work forming other sections or joints, and thus the process goes on. At every inspiration of breath we take in more or less of these enemies of man, but constitutions not weakened by worryment, mental or physical exhaustion, as a rule repel their assaults as readily as a well-fortified fortress would the attack of an enemy. Yes, we drink in unseen living organisms in the water we use, and

Eat Them From Our Tables.

Only a few weeks ago we were amusing ourselves with our microscope, when we placed a drop of water on the glass plate, and to our astonishment on applying our eye to the microscope we saw the most vicious and repulsive forms of life imaginable disporting themselves as though they were attending a high jinks party. The very idea of taking these lizards, reptiles and sea-serpents wiggling and wriggling into our stomach was most repulsive, and we almost wished ourselves an angel to avoid such a catastrophe. But as we reflected that we could cook their goons by boiling the water, we concluded we had better remain on this mundane sphere awhile longer.

Our next experiment was to place under the microscope some of the mealy substance that accumulates around the stems of figs that have been packed two or three years. In this we discovered a large number of

Big Bugs and Little Bugs.

Resembling in form and appearance the tumblebug we sometimes see in the road on a summer day. At first they seemed a little confused at the new condition of things, but soon became reconciled to their new lot and meandered around as lordly as heirs to some throne, little thinking had we left them on the figs some hungry person (not ourselves) would have made a meal of them. Thus we see life is a constant warfare with the seen and unseen forces of Nature.

USEFUL INFORMATION.

A PNEUMATIC TIRE FOR BICYCLES.—A pneumatic tire for bicycles has been invented in Belfast, Ireland, which, if all that is claimed for it be true, must make a new era in this method of recreation. The tire is about 2½ inches in diameter, and is composed of an outer covering of rubber, graduated in thickness from about one-quarter of an inch, where it touches the ground, and is protected by canvas, where it is attached to the rim, which is very broad and nearly flat. Inside this outer covering is an inner tube which contains the air. The air is pumped in with a foot-ball blower, and a patent air valve prevents its return. Vibration is practically annihilated. A frame so protected should wear out two frames with solid tired wheels; and not only so, but riders will be able to use very much lighter frames without any danger of their collapsing. In a recent 50-mile road championship in Phoenix Park, Dublin, one of the competitors rode a racing safety, fitted with "pneumatic" tires, and scaling only 23 pounds, and yet it passed through the ordeal—an ordeal trying to even the heaviest makes—without the slightest damage.

OIL FROM CORN is one of the latest products which modern science every now and then throws upon the world. The maize, which is now grown in the United States at the rate of some 2,000,000,000 bushels per year, has been experimented with and found capable of yielding 3½ per cent of its weight in oil, the germ of the kernel being the part from which the oil is extracted. The new material is of a pale yellow color, somewhat thicker than either the olive or cotton-seed oil, and does not seem to be readily available as a substitute for them, but it is well adapted for lubricating purposes, and may be used as a salad dressing, while it seems to be desirable for liniments.

PULP TO BE MADE BY ELECTRICITY.—The Portland (Me.) Express says: Some of our Kennebec pulp-men are becoming so deeply interested in a new departure in the manufacture of fiber from wood that they are willing to in-

vest their money. The agent employed in reducing the wood is electricity, and it is claimed that the fiber is manufactured so cheaply that the entire pulp business will be revolutionized, and the digesters now in use be driven out. Kellner of Germany has been experimenting for several years with electricity in this direction, and has now succeeded in perfecting the process. A patent on the process has been applied for in the United States, and our Kennebec men have an interest in it, and are making plans to erect a plant for the manufacture of fiber by electricity.

SHOP NOTES.

Suggestions for the Shop.

We clip the following shop suggestions from the Boston Journal of Commerce:

As long as there are two sides to everything we must expect to find everything with two ways to work with. A bolt nut can be screwed on with the corners up or left with the corners down, and still be in accordance with some of the heat engineers and draughtsmen. Both ways have their advocates, though it is the simplest thing in the world to see that they should be left down where they belong.

Beils, too, have two ideas to look out for, unless they are made double with the grain side out on both of them; but where they are not they can be put on either side out first and the reason studied up afterward.

The strength of iron can be increased by heating and cooling suddenly in water, but it is more likely to snap off suddenly by the operation, so forgemen allow time for it to cool gradually, as it is the strain that it will hold on the snap that they are looking out for.

Steel has been found to stand a greater strain by being hardened in oil than in water.

How much stronger will it make a pulley if you have the rim increased to twice its thickness? Not any that we know of, as the centrifugal force increases directly with the weight.

How is it figured out that a wheel built of soft pine will stand twice the number of revolutions per minute that cast iron will? It is done in this way: Cast iron is 12 times as heavy as soft pine when compared in regard to their volume, and only twice as strong when taken on a direct pull. In this way soft pine has six to one in its favor when working under the same conditions as that of cast iron, but as the centrifugal force increases as the square of the speed, it can only be made to run twice as fast as an iron pulley and have enough left to make up for the loss in strength where the fellows overlap each other in their make-up.

It is a good trait in a lathe man to think over everything carefully, and be careful of what is required, long before attempting a difficult undertaking, but it is thought better in these times to grasp the idea at once and start in on a job immediately, trusting that the thoughts may flow freely enough to keep ahead of anything that may turn up to interfere with the work till it is finished.

It would be well for some of the machine-builders nowadays if they could be made to work awhile with their own machinery, and let them see how they would like to operate a lever that shuts by where there is not room for the fingers, or a hand-wheel that gives the knuckles a chance to get knocked off at every turn.

A new way to get a leather covering for a pulley on tight is to make it wide enough to stand off on the edge a little, then round it over on to the inside and draw the edges together after the fashion of lacing up a drumhead. It must make a hard-looking sight, yet it is recommended, even though we must use iron tie rods instead of drum strings. A belt that is loaded too heavily for a good, smooth iron pulley is loaded too heavy for a covered wheel, and will show signs of its being overloaded whenever a paper covering is used by throwing the obstructions on the floor.

To keep a lot of thin hack boards from splitting, which have to be made new every day, just run some wire rods through them crossways and rivet a washer on each side. The rods, one at each end, will do the business, and if the boards split they are still as good as ever. But how about boring for a rod that is nearly as large as the stock is thick? Cut the wires and point them flat drill fashion, and bore these through themselves and leave them in their places. You can tell from the heat which side the board the stock is growing the thinnest, and by bending the board as if it were warped a trifle, the rods can be made to keep in the center until they reach the opposite side.

We still find about as many as ever fussing over a belt hook. When a belt gives out, it generally breaks across where the ends of the hooks come, and if there were enough belting to spare it would be a good idea to take a knife and clip the piece off close to the other end of the belt hook and throw the piece away. But not the screwdriver man he brought into use, and the end of the hooks lifted to an angle, by means of which no one has been able to tell, and knocked with a tack hammer. Better turn the splice backward till one or both apices are brought into the center of the hooks; then open out the ends on one side and slip both pieces off over them.

ELECTRICITY.

A New Electric Block System.

Both history and experience teach us that whatever may be the demands of advancing civilization for the protection of the people—their property or their lives—the thinking brains, the cunning hands, and the right men always present themselves to meet the requirements of progress. With this fact in view, we need have no fear that so great a boon as the use of electricity in furnishing a perfect illuminating medium, or in conveying our commands through the avenues of our great cities, or in regulating the movement of railroad trains safely along the iron track, will be made not only eminently practicable, but practically safe from danger to life and limb. We have already made allusion to a safety appliance for removing danger from electric-light wires, by the use of which a powerful electric current may be instantly rendered free from danger the instant a dangerous break occurs. We have now before us the details of a new and automatic electric block signal system by which the danger of collision is rendered almost if not quite an impossibility. The system may be extended along the whole line of road and is as equally applicable to a single as to a double track. It is automatic in action and thus much cheaper than the system at present in use. The indications are that a most important advance has been made in securing safety from railroad collisions. So important is the invention considered at the Patent office that a special hearing was granted to speed the same through the office. The papers are said to cover everything that could possibly apply to the invention. When engines run backward, the batteries are reversed accordingly. Switches are protected at each end, and automatic signals can be put up at country roadways or dangerous crossings showing that a train is approaching from a mile or one-half mile, or any distance away desired. Foreign patents have also been applied for.

The inventor is a Pittsburg man, who claims that it will do away with the present block system, and render useless the large army of telegraph and block signal operators that are now employed. A model has been shown, says the Pittsburg Dispatch, operating on a double track 40 feet long, with sections or blocks every four feet. At each block two little signals of red and white, to show either danger or safety, were placed on either side of the track, with the safety signals all up. A tiny engine then started down one of the tracks, and as the first block was passed the safety signal dropped and "danger" was displayed, showing to any train coming behind that the block was occupied. At the next block the second danger signal was displayed, showing that the second block was occupied, while simultaneously the first block displayed a white signal, indicating that it was clear, and so on down the line until the end, showing that every block could hold a train in safety and not allow it to pass on until the block ahead was clear.

This exhibition is said to have been perfectly convincing to the railroad men present, as was also a demonstration on a single track, where danger lies not only behind but from ahead, showing beyond doubt its practicability and its assured success.

This last proof of its perfection called hearty congratulations and assurances of success from the practical men present, while all admired the simplicity of the affair.

THE ADAPTABILITY OF THE ELECTRIC MOTOR.—Perhaps there is nothing that has occurred recently that better illustrates the quick and ready adaptability of the electric motor for all kinds of service where power is required than the misfortune which befell the large printing and publishing establishment of the John Morris Co. at Chicago, which completely deprived the company of any power to run its numerous presses, paper-cutters, rollers and other forms of machinery used in connection with its business. As is known, one of the rollers exploded, ruining the steam plant, the repairs to which cannot be made short of a month or six weeks. The power required for running the presses is about 40 horse-power, and notwithstanding that this accident happened late Friday afternoon, by Saturday night a 40 horse-power Thomson-Houston motor was in position and everything in readiness to start up the great presses and the work of the establishment upon the arrival of the help early Monday morning.

AN ELECTRICAL RAILROAD BRAKE.—Prof. Forbes and I. A. Timmer of London have invented an electric railroad brake which appears to possess a wonderful efficiency. A car fitted with this brake was suddenly slipped while moving at the rate of 42 miles an hour, and was brought to a standstill in 450 feet. Another car was brought to a stop in 180 feet from a speed of 30 miles an hour. Of course by this device the adhesion due to friction is added to the resistance due to electrical attraction, the latter being nearly or quite equal to the former. To all appearances, Mr. Westinghouse may soon have to look out for his laurels.

CUTTING DOWN WIRES.—It is said that 338 poles have been cut down, and 472,692 feet of wire have been removed from the streets of New York during the recent raid upon the electric wires of that city.



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W. B. EWER.

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[NEW THIS ISSUE.]

Machine Tools, Etc.—L. A. Heald.
Amalgamating Machinery—A. B. Paul, Middle Creek.
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Works for Sale—Gillispay & Childs.

See Advertising Columns.

Passing Events.

The strike of the molders, coremakers and apprentices in the local foundries is very greatly to be deplored, in view of the general depression in the iron industry. The foundry companies, however, protest that it is impossible for them to compete with Eastern manufacturers under the present condition of affairs. This struggle has been anticipated for a long time.

The large smelting organizations of the United States have combined against the Lead Trust, with a view, as they say, of "placing their interests beyond the control of the Lead Trust."

The project of extending the Sastro tunnel westward for a mile is again being discussed. Many believe that there is rich ground in that direction that the tunnel will open.

The warm rains of this week have had the effect of melting off much snow and raising the rivers somewhat, but no harm has been done from overflows.

A very considerable falling off of hullion production is shown in last month's work in the mines of this State and Nevada, owing to the unprecedented storms which have prevailed.

ANOTHER "old Californian miner" reports favorably on the gold region in Maine, extending from Sandy river to Androsoggin.

An Inventor Rewarded.

We were reading the other day in a Philadelphia paper the account of how an inventor, C. H. Van Hagen, was rewarded by the Chester Twist Drill Co. for devising a machine to forge twist drill. He was paid \$25,000 in cash, \$65,000 in stock and given the position of superintendent at \$50 per week. This simply shows that there are prizes as well as blanks for inventors. An instance of a quick reward for invention occurred in this city within a few weeks and with larger figures than those cited above.

Dr. Benjamin Marshall of San Francisco obtained through the MINING AND SCIENTIFIC PRESS Patent Agency on Jan. 28th, a patent for a sash balance and lock, and a company has been organized to make and introduce the device. Dr. Marshall receives \$200,000 in cash and stock valued at \$50,000 in the company. This gentleman has invented several other devices of importance, among them a nut lock which is in use on the Southern Pacific Railroad and has just been applied on the Pennsylvania Central.

His invention is one of that class of devices for raising window-sashes in which a spring is employed, and the invention consists in the novel arrangement and combination of the spring, the pinion which it actuates and the rack-wheels the pinion engages. It further consists in combination with these parts of a suitable catch for engaging the pinion or the rack and locking the sash in any desired position. The object is to dispense with the weights by the substitution therefor of a simply arranged spring-actuated device which can be readily applied to any sash, and the use of which will simplify the construction of window-frames or casings.

In the bottom rail of the sash and from one end thereof is made a deep hole in which is seated the spiral spring, and mounted on the stile of the sash is a pinion which is so connected with the spring that as it rotates in one direction, it winds up the spring and is itself rotated in the other direction by the unwinding of the spring. This connection is preferably effected through the turn-rod which carries the pinion on its outer end, said rod being let into the hole of the sash-stile, the spring encircling it. The outer end of the spring is attached to the rod, and its inner end fastened in the base of the hole. Secured properly to the inner surface of the head of the window-casing is a rack with which the pinion engages.

A spring-controlled bolt is seated in the window-stile and adapted to project its end between the pinion-teeth whereby the parts are locked and the sash held in any desired position.

The operation is as follows: Suppose the sash to be in a raised position. Now, upon pulling it down, the pinion, traveling in the rack, turns the rod whereby the spring is wound up. Then when the sash is down and is released, the spring in unwinding returns the rod and rotates the pinion, which, traveling in the rack, raises the sash. The bolt when operated engages the pinion-teeth and thereby prevents it from turning, or it engages the rack-teeth, as may be desired, and in this manner the sash may be locked in any position desired.

Thus no weights are needed and the present complex construction of the window-casing is avoided. The catch may be a spring catch or other form, if desired, its function being to lock the sash by preventing the movement of the pinion in the rack.

SUTRO TUNNEL.—It is stated by well-informed persons that work on the long-proposed project of extending the Sutro tunnel, Virginia City, Nevada, farther west will be commenced within the next 60 days. It is the intention to drive the tunnel ahead through the Savage Mining Company's ground on west fully 1000 feet before stopping for ventilation or for other purposes. As the work progresses it will be watched with unusual interest by practical mining men, who assert, without qualification, that there are at least two, and perhaps more, well-defined lodes on the Comstock, one of which is nearly all silver-bearing and the other nearly all gold-bearing quartz. The first has been worked for years, but work to develop the latter has only recently been thoroughly commenced.

The Molders' Strike.

On Monday morning last a strike was inaugurated in this city by the Iron-Molders' Union against the local foundries, and 200 of the molders quit work. Since then the core-makers and some apprentices have also left their work. The Molders' Union gives the following as the number in the shops affected: Vulcan Iron Works, 17 men, 2 apprentices; Union Iron Works, 40 men, 7 apprentices; Rio-don Iron Works, 14 men, 5 apprentices; Pacific Iron Works, 16 men, 2 apprentices; Steel Works, 15 men, 2 apprentices; Occidental Foundry, 14 men, 3 apprentices; Fulton Iron Works, 20 men, 5 apprentices; National Iron Works, 11 men, 3 apprentices; Vulcan Iron Works, 2, 9 men, 2 apprentices; City Iron Works, 10 men, 3 apprentices; Lewis & O'Connell's, 12 men, 2 apprentices.

There are only 275 molders involved in the strike, but the laborers, core-makers, pattern-makers and assistants have nothing to do when the molders quit, so they, too, will be compelled to quit work.

The discharge of Joseph F. Valentine and two other Union men by Steiger & Kerr was the cause of the strike in the Occidental Foundry, while the cause of the strike in the other 13 establishments was the action of the Engineers and Foundrymen's Association in giving notice that on and after March 10th the Union's regulations regarding time of work and pay would be ignored, and the agreement between employers and employees declared void.

The members of the Engineers and Foundrymen's Association complain that while they are paying the men higher wages than are paid in the East, they do not get a full day's work for the wages paid, the men doing only a specified amount by agreement among themselves. It is not desired to cut down wages, but matters have come to such a pass that the men must work on such terms as will allow the foundries to compete with the East. As it is, even such common castings as house-fronts are shipped here from Chicago, and large contracts which should be carried out here are finished elsewhere.

Trouble with the molders has been anticipated for the last year or two, for the foundrymen have been restive under their actions. Some of the men are not worth half what others are, but all must receive the same. The apprentice system, too, is bad, there being little chance under existing circumstances for the rising generation to learn a trade.

Eastern manufacturers pay \$2.50 per day for molders, while here they are paid \$3.50, and the local foundrymen must compete with those who pay the former rate. The foundrymen claim that they cannot pay higher wages and have a day's work limited to suit the ideas of the members of Molders' Union, and then compete with Eastern manufacturers.

The proprietors of the foundries say no better time for the strike could have been chosen, since business in the shops is very dull. Several of them aver that they will send patterns East and have the castings made there and shipped here, and can do this as cheaply as it could be done in San Francisco under present circumstances. Both sides in the contest seem confident of success. The Foundrymen's Association assert that it is impossible to continue as they have been doing. The strike involves our most important manufacturing industry, and if continued will cause great loss to the State.

The Union declares that it will make no settlement with the manufacturers unless they agree to pay the minimum rate of wages and employ but one apprentice for every eight journeymen. The Union further declares that it has never restricted and never will restrict the amount of work to be done by any member. This latter statement the foundrymen deny. It is certain that the foundry business has not been profitable of late in San Francisco, and that less work is being done than should be the case.

A NUMBER of merchants and manufacturers of this city have petitioned the Pacific Coast delegation in Congress to lend their aid in repealing the section of the Interstate Commerce law known as "the long-and-short-haul section."

On the Comstock they crushed 4840 tons of ore last week, the yield being \$109,073.

Pohle's Air-Lift Pump.

(Continued from page 161.)

was started. Beginning with atmospheric pressure, the increase of pressure was noted for each 30 strokes of the compressor piston, until a pressure was reached beyond that required in the pump tests. The contents of the receiver was 117 cubic feet. The compressor made uniformly one stroke per second. The atmospheric pressure was 2.51 feet of mercury. The air was unusually dry.

The data obtained formed the basis for calculating the number of pounds of air delivered, per piston-stroke of the compressor, to the receiver at any required pressure. An average of the results of the two tests was adopted. The following table gives the values obtained:

Pressure receiver, lbs. per sq. in.	0	5	15	25	30	35	40
Lbs. of air per stroke	.104	.098	.088	.081	.079	.077	.076

The second method adopted was as follows: A small auxiliary chamber B was attached to the receiver. (See Fig. 3.) Compressed air entering this chamber escaped into the atmosphere through a carefully-measured circular orifice in thin plate. After a pump test had been completed, the compressor was kept running, cock C was closed, and cock A opened and adjusted until the conditions in the pump test, regarding number of strokes of compressor per minute and the pressure in the receiver, were repeated and maintained.

The pressures and temperatures of the compressed air in chamber B and of the atmosphere furnished the data upon which to make a calculation of the quantity of air escaping through the circular orifice. This quantity was evidently the same as that supplied in the pump test. Such tests were made from time to time, and served to check the values taken from the table given above.

The engine used to drive the compressor was built for ten times the power actually applied to the compressor; hence a test of the efficiency of the entire plant was not made.

In the paper referred an extended table is given of the pump tests, for which we have not space. The writers say: The "efficiency of the pump" is based upon the least work (L) theoretically required to compress the air and deliver it to the receiver. See Fig. 4.

Atmospheric conditions..... P_a T_a
Receiver..... P_r T_r

The values given in the table take no cognizance of the losses of power in the engine and compressor.

If we assume the efficiency of a suitable compressor to be 70 per cent, the efficiency of the pump and compressor together would be 70 per cent of that given in the table for the pump alone.

An inspection of the above table shows:
1st.—That, for a given submerison " h " and lift " H ," the best efficiency was obtained when the pressure in the receiver did not greatly exceed the pressure due to the submerison. [This was only true when the ratio $\frac{H}{h}$ was kept within reasonable limits—i. e., where H was not much greater than h .]

2d.—That the smaller the ratio $\frac{H}{h}$ the better was the efficiency.

We may say in a general way that under the better adapted pressures in the receiver, the pump, as erected, showed the following efficiencies:

For $\frac{H}{h}$	0.5	1.0	1.5	2.0
Efficiency	50%	40	30	25

It is apparent that the air pipe should not have been reduced at the discharge end, as such reduction necessitated a greater pressure in the receiver for the delivery of the air to the pump.

Unfortunately, the data is wanting for a reliable estimate of the loss due to the frictional resistance in the small air-pipe. A rough estimate shows that such loss must have been large. The substitution of a 1½-inch air-pipe in place of the 1-inch would have appreciably augmented the efficiencies given in the table. In justice to the pump, a considerable allowance should be made for this easily avoidable loss.

The last test shows a limit of lift for a given submerison, beyond which a large excess of pressure is required to pump even an insignificant quantity of water. For good efficiency, it becomes necessary that the lift should not be very great as compared with the submerison.

Where a shallow sump only is available to pump from, and a considerable lift is to be made, Dr. Pohle introduces an auxiliary pipe to receive the water, after being pumped to a small height, and act as pump-well for a higher lift. See Fig. 5.

No attempt has been made toward an analytic treatment of the action of this pump, but its simplicity commends it for many purposes.

Among the numerous applications which Dr. Pohle proposes for this air-lift may be mentioned: The drainage of mines, the supply of water from deep wells, the lifting of liquids which damage the working parts of pumps ordinarily used, the increase of lift and capacity of other pumps by introducing an air-lift into the pump column.

Gold-Milling Mortars.

In gold-milling in the Black Hills two types of mortars are used. The points of difference lie in the inside dimensions of the lower part of the mortar, and in the arrangement and number of inside amalgamated plates. These differences are described in a paper by H. O. Hoffman of Rapid City, Dakota, read before the American Institute of Mining Engineers.

The Homestake mill mortar (Figs. 1, 2 and 3), weighing 5400 pounds, is $54\frac{1}{2}$ inches high and $54\frac{1}{2}$ inches long. The feed opening, beginning $6\frac{1}{2}$ inches below the top, is 24 inches long, $4\frac{1}{2}$ inches wide and 7 inches deep. On entering the mortar it remains 24 inches long and 7 inches deep. At the bottom of the feed, forming the continuation of the incline over which the ore passes into the mortar, is a lip $4\frac{1}{2}$ inches above the inside bottom of the mortar. As the lip wears out fast, it might be well to cast it thicker, as has been done on the Caledonia mortar. Taking the front view of the mortar, we find $15\frac{1}{2}$ inches from the bottom the discharge opening $48\frac{1}{2}$ inches long and $2\frac{1}{2}$ inches high. The frame is inclined outward about 10 degrees from the vertical.

On the short sides of the discharge opening are grooves to receive the chuck-block, screen-frame and curtain, which are held in place by keys and sockets. The chuck-block is also fastened at the bottom by two horizontal keys, supported by lugs on the outside lip of the mortar below the discharge. Viewing the mortar in cross section, we first have the two bottom flanges, 3 inches high and 5 inches broad. The bottom of the mortar (the mortar-bed) is $7\frac{1}{2}$ inches thick, the sides, at the foot of the dies, $3\frac{1}{2}$ inches. The inside dimensions are: Width at the bottom, $10\frac{1}{2}$ inches; length, 50 inches; height to issue of mortar (not of pulp), $8\frac{1}{2}$ inches; width at this point, $13\frac{1}{2}$ inches; at the top of discharge-opening, 20 inches; at the top of mortar, 16 inches; total inside height, 47 inches. The casting is three-fourths inches thick from the top down to the feed-opening, on three sides, the back being a little thicker.

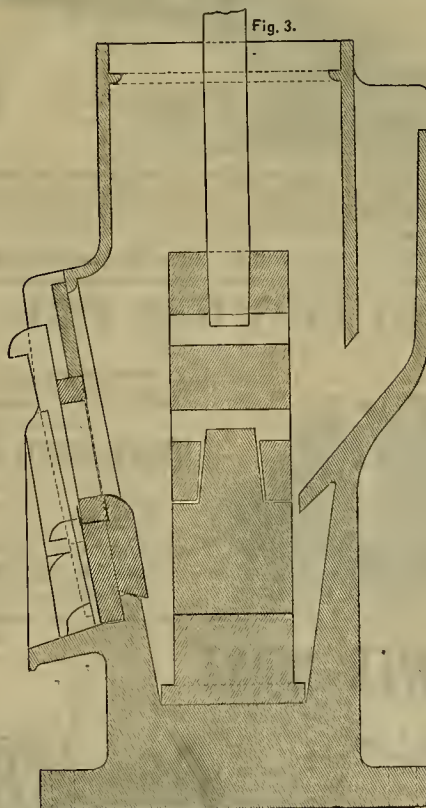
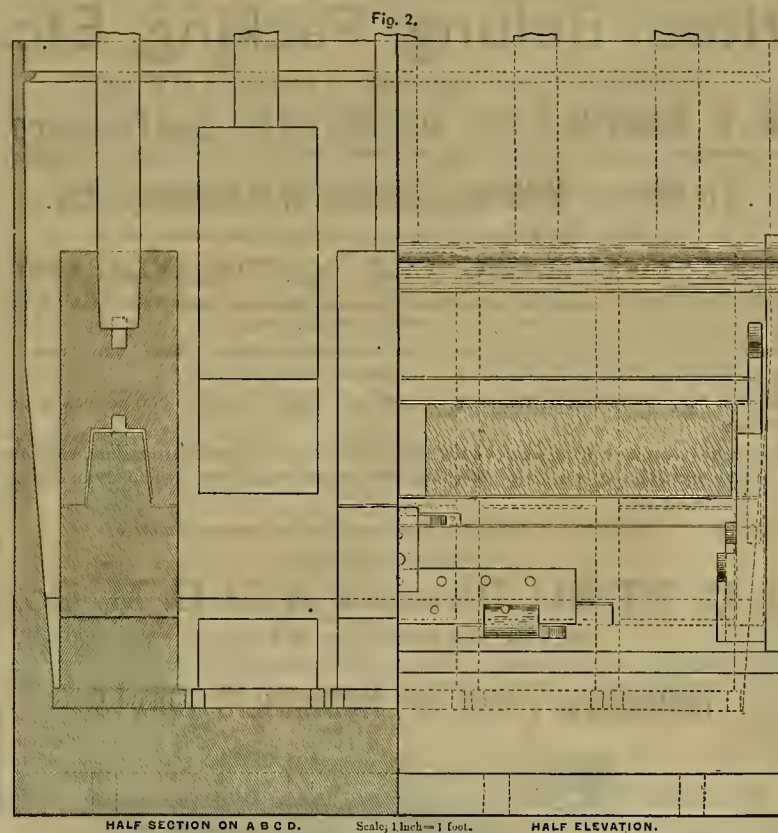
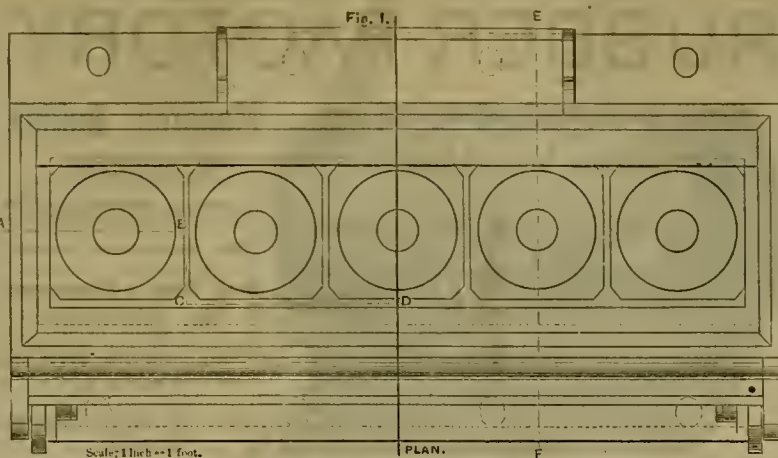
A mortar lasts four years, wearing pretty uniformly at the sides and back.

The Caledonia mortar weighs 5700 pounds, is $57\frac{1}{2}$ inches high and 54 inches long. The feed-opening, beginning $15\frac{1}{2}$ inches from the top, is 3 inches wide, 11 inches deep, and extends the entire length of the mortar, having a strengthening rib in the center. At entering the mortar it is $50\frac{1}{2}$ inches long and $7\frac{1}{2}$ inches deep. Here the top, $2\frac{1}{2}$ inches thick and 8 inches wide, measured on the incline, begins. The bottom of the lip is 15 inches from the foot of the dies. As in the Homestake mortar, the ore is discharged toward the head of the stamp. The lip serves also as a protector to the amalgamated copper plates below it.

The discharge-opening in front, 50 inches long by 17 inches high, begins 20 inches above the bottom of the flange. Its frame is also inclined outward about 10 degrees from the vertical. The grooves on the sides, receiving only the screen-frames and the curtain, are simpler in construction than those of the Homestake mortar. The lugs for the horizontal keys are the same. Taking the cross-section, we find the flanges 3 inches thick and $4\frac{1}{2}$ inches wide. The mortar-bed is 7 inches thick, the sides, at the foot of the dies, $4\frac{1}{2}$ inches. The inside dimensions are: Width at the bottom, 10 inches; length, $50\frac{1}{2}$ inches; height, 14 inches to the issue of mortar and pulp, where the width is 16 inches. This increases to 19 inches at the top of the discharge. The top of the mortar is $13\frac{1}{2}$ inches wide, and the total inside height $50\frac{1}{2}$ inches. The casting, from the top down to the feed-opening, is $\frac{3}{4}$ of an inch thick.

A mortar lasts six years, and wears out more on the short sides than at the back.

In comparing the two types, we see that they differ in the feed opening, as already discussed. The feeding-lip also differs, that of the Caledonia mortar being thicker and wider than the other. The increase of width is necessitated by the presence of the amalgamated copper-plate below the lip; the mortar itself is also wider at the issue for the same reason. The depth of the Homestake mortar is $8\frac{1}{2}$ inches, and that of the California mortar 14 inches. The latter corresponds with the height at which the issue of the pulp occurs. In the Homestake mortar, the issue is raised by the insertion of the chuck-block $16\frac{1}{2}$ inches above the



MORTAR AND STAMP FOR HOMESTAKE MILL.

foot of the dies, thus giving, with a shallower mortar, a deeper issue of pulp than the Caledonia mortar.

The Homestake management casts its own dies. The quality of iron used is between gray and mottled, the top of the cylindrical part being chilled. The foot-plate has beveled corners and is 10 inches long, $10\frac{1}{2}$ wide and $1\frac{1}{2}$

inches thick. The cylindrical part, or "hoss," is 9 inches in diameter and 5 inches high. The level of the die is 10 inches below the discharge, which takes place over the chuck-block. The die weighs 121 pounds (one-seventh of the weight of the stamp), and lasts about six weeks, crushing 189 tons. By that time the cylindrical part has become slightly convex, and is worn down to two inches from the foot-plate. Its weight has then been reduced to about 30 pounds; thus 48 pounds of iron are consumed for every 100 tons of rock that are crushed.

The Caledonia mill buys its dies outside. They are of chilled white iron. The foot-plate has also beveled corners, is 10 inches wide by $9\frac{1}{2}$ inches long and $1\frac{1}{2}$ inches wide. The cylindrical part is 8 inches in diameter and $5\frac{1}{2}$ inches high. While the dies in the Homestake mortar fill its bottom completely, those of the Caledonia fit perfectly in the width only, there being a three inch space in the length that has to be divided up between the five dies. The distance from bottom of screen to top of die is 6 inches. The die weighs 160 pounds (about one-fifth of the weight of the stamp) and lasts three months, crushing 300 tons of hard rock. The cylindrical part is then worn down within one inch of the foot-plate. The worn-out die weighs 38 pounds, making the consumption of iron 40 pounds for every 100 tons of rock.

Amalgamated copper plates are placed along the entire length of the mortar. In the Homestake mortar one plate is set to the discharge opening; in the Caledonia mortar there are two plates—one under the discharge, the other beneath the lip of the feed-opening.

The Homestake mills use the so-called chuck-block (half elevation, Figs. 2 and 3), placed against the lower flange and the two side flanges of the discharge. The chuck-block consists of a 2-inch plank, bolted to the back of a $1\frac{1}{2}$ -inch board, and extending from 2 to $2\frac{1}{2}$ inches above it. Its inside upper edge is rounded off, and over this, and along the inside face, a $1\frac{1}{2}$ inch copper plate is fastened with iron screws. The recess formed on top of the front board, $1\frac{1}{2}$ inches wide and from 2 to $2\frac{1}{2}$ inches deep, is taken up by the lower part of the screen frame. Between this and the front board is placed a strip of carpet to form a tight joint. The frame is held in place by a vertical piece of flat iron bolted to the center of the front board, a horizontal wedge being driven between the two. The front board has an iron facing along its lower half and two vertical strips toward the ends, to protect the wood against the two horizontal and the two vertical wedges with which it is fastened to the mortar. To the back (beneath the 2-inch plank having the sheet copper) is tacked a strip of rubber cloth which helps to make a tight joint between the wood and the flange of mortar.

Wooden chuck-blocks last six months. At this time the coppers have to be removed and put upon new blocks, or they are scraped carefully, put aside, melted and sold. Mr. R. Graham of the Homestake has replaced the plank to which the copper-plate is screwed by iron. Of the free gold, 55 per cent is caught on the inside plate. At the Caledonia mill, of the free gold, 60 per cent is caught on the inside plates. This mill has copper-plates at both front and back, the aim being to keep the pulp longer in the battery, and thus counteract the refractory character of the ore.

ACADEMY OF SCIENCES.—The Academy of Sciences held their regular meeting Monday night, with the president, Dr. Harkness, in the chair. Dr. Bahr exhibited a specimen of the larva of a caterpillar with a growth of fungus attached, found in New Zealand. No regular paper was read, and in its place J. W. Raymond made a few remarks on "Sub-Alpine Molnacs of the Sierra Nevada," specimens of which were shown.

ROBERT PROUT, with Jack and Sandy Richards, Tom Davis, John Cocking, John Rodda and John Bryant, all Comstock miners, have gone to a mine near Prescott, Arizona. They get \$3.50 a day from the time they leave, traveling expenses paid, lodgings furnished, and they to pay \$1 per day board—equal to \$2.50 per day clear, with regular work right straight along.

THERE is again talk of establishing smelting works in Los Angeles. The Preston system of working ores by the heat from crude petroleum is that which is being considered.

The Mining Companies' Financial Standing.

The following is the financial standing on the first Monday of the present month of the mining companies listed on the two exchanges in this city:

	Cash.	Debt.
Alta.....	\$31,652	\$.....
Alpha.....	3,261	.....
Andes.....	8,134	.....
Bodie Coa.....	20,098	.....
Benton Con.....	80,073	.....
Belcher.....	25,524	.....
Belle Isle.....	5,140	.....
Best & Belcher.....	12,051	.....
Bulwer.....	12,836	.....
Challenger Con.....	12,711	.....
Caledonia.....	7,356	.....
Chollar.....	125,181	.....
Con. Cal. & Virginia.....	177,025	.....
Confidence.....	7,110	.....
Con. Imperial.....	2,939	.....
Con. New York.....	8,377	.....
Commonwealth.....	18,067	.....
Crocker.....	9,634	.....
Crown Point.....	18,131	.....
Del Monte.....	12,877	.....
East Sierra Nevada.....	5,954	.....
Eureka.....	6,007	.....
Eschschuer.....	17,418	.....
Oould & Curry.....	5,172	.....
Grand Prize.....	**44,604	.....
Hale & Norcross.....	10,341	.....
Holmes.....	9,716	.....
Independence.....	263	.....
Julia.....	7,903	.....
Justice.....	.....	.....
Kentuck.....	4,266	.....
Lady Washington.....	13,315	.....
Locomotive.....	**829	.....
North Belle Isle.....	20,630	.....
North Commonwealth.....	19,243	.....
Mexican.....	13,899	.....
Mono.....	13,403	.....
Nevada.....	15,233	.....
Nevada Queen.....	10,587	.....
Occidental.....	**5,200	.....
Opbir.....	454	.....
Overman.....	21,220	.....
Peer.....	558	.....
Peerless.....	8,152	.....
Potter.....	15,598	.....
Savage.....	6,537	.....
Scorpion.....	3,932	.....
Seg. Belcher & Mides.....	8,642	.....
Sierra Nevada.....	19,724	.....
Silver King.....	**4,600	.....
Standard.....	19,515	.....
St. Louis.....	360	.....
Syndicate.....	7,334	.....
Union Con.....	267	.....
Utah.....	8,839	.....
Weldon.....	2,412	.....

*Sales of concentrates to be received.
 †With more bullion to be received.
 ‡Against which there is an overdraft at the Nevada bank of \$54,597 (further shipments of bullion and the partial expenses of the mine for the month of February are to be accounted for).
 §Overdraft of \$10,000, with \$35,000 in bullion on hand.
 ¶February bullion and mine expenses not included.
 **Collecting assessment.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, term of subscription, and give it their own patronage, and as far as practicable aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

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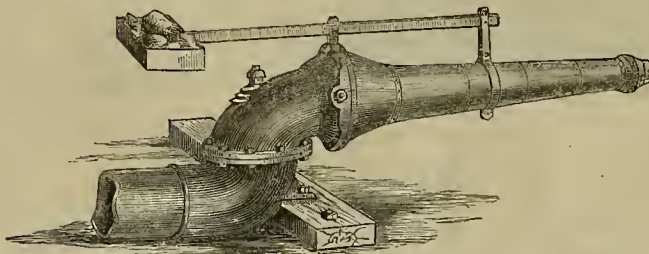
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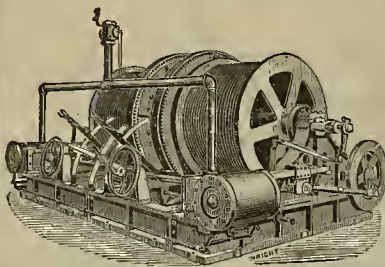
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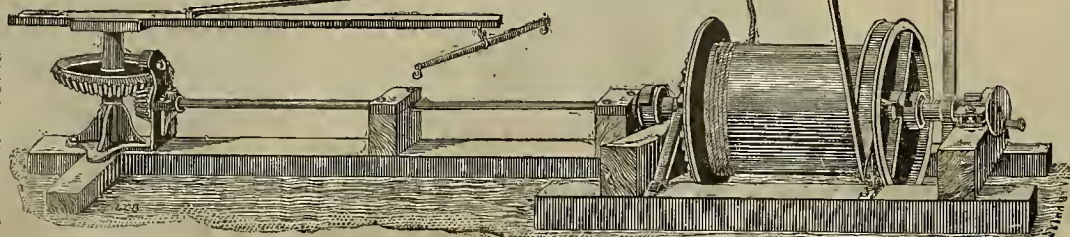
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DELINQUENT SALE NOTICE.

Gray Eagle Mining Company. Location of principal place of business, San Francisco, California. Location of Works, Placer Co., Cal.

NOTICE.—There are delinquent upon the following described Stock, on a count of Assessment (No. 16) levied on the 21st day of January, 1890, the several amounts set opposite the names of the respective Shareholders, as follows:

NAMES.	No. Certificate.	No. Shares.	Am't.
D E Allison.....	604	25	\$1 00
D Bowers.....	319	20	80
D B Wers.....	404	500	20 00
F W Blaney.....	284	20	80
H M Bullington, Trustee.....	503	4475	179 00
O H Bogart, Trustee.....	463	4	1 00
O H Bogart, Trustee.....	447	5000	200 00
O H Bogart, Trustee.....	471	500	20 00
O H Bogart, Trustee.....	472	500	20 00
James Clark.....	461	101	4 00
H W Gay, Trustee.....	181	500	20 00
B W Haines.....	495	500	20 00
B W Haines.....	499	500	20 00
W C Hunter, Trustee.....	506	100	4 00
W C Hunter, Trustee.....	507	100	4 00
W C Hunter, Trustee.....	508	100	4 00
W C Hunter, Trustee.....	509	100	4 00
W C Hunter, Trustee.....	510	100	4 00
W C Hunter, Trustee.....	511	100	4 00
Cyrus W Jones, Trustee.....	421	1000	40 00
John Linden.....	84	700	4 00
H M Rosskrans.....	39	600	24 00
Oeo Ross.....	145	100	4 00
Geo Ross.....	148	100	4 00
Geo Ross.....	147	100	4 00
Oeo Ross.....	145	100	4 00
Oeo Ross.....	149	100	4 00
Oeo Ross.....	240	20	80
C S Stout, Trustee.....	476	2000	80 00
C S Stout, Trustee.....	477	053	33 12
Mrs M E Stout.....	170	700	20 00
Mrs M E Stout.....	188	50	20 00
W A Searles, Trustee.....	513	1000	40 00
J N Taylor.....	330	40	1 00
Theo Wetzel, Trustee.....	176	200	3 00
Theo Wetzel, Trustee.....	225	8	32
Theo Wetzel, Trustee.....	205	312	12 43
A H Winn, Trustee.....	466	1000	40 00
A H Winn, Trustee.....	467	500	20 00
A H Winn, Trustee.....	468	500	20 00

And in accordance with an order of the Board of Directors, made on the 21st day of January, 1890, so many shares of each parcel of such Stock as may be necessary, will be sold at public Auction, at the office of the Company, Room 11, No. 303 California street, San Francisco, California, on MONDAY, THE SEVENTEENTH (17th) DAY OF MARCH, 1890, at the hour of 1 o'clock P. M. of said day, to pay said Delinquent Assessments thereon, together with costs of advertising and expenses of sale.

J. M. BUFFINGTON, Secretary.
 Office, Room 11, No. 303 California street, San Francisco, California

DIVIDEND NOTICE.

Office of the Pacific Borax, Salt and Soda Company, San Francisco, February 23, 1890.

At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 29) of One Dollar (\$1.00) per share was declared, payable MONDAY, MARCH 10, 1890, at the office of the Company, No. 230 Montgomery Street, Rooms 11 and 12. Transfer Books close March 5, 1890, at 3 o'clock P. M.
 ALTON H. CLOUGH, Secretary.

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The Rotary Snow-plow.

During this very severe winter the Central Pacific Railroad Co., in order to keep its road over the mountains in operation, has had to place almost entire dependence on the rotary steam snow shovel. Without this appliance it would have been impossible to clear the road of snow. During the heaviest of the storms, they had only one of these plows, and it was kept constantly at work, performing its office satisfactorily and to the admiration of all who had anything to do with it.

The rotary steam snow shovel, an engraving of which is shown on page 161, consists of a heavy wrought-iron frame made of 12-inch I beams, strongly braced, carrying upon its forward end a steel drum 9 feet in diameter, with a square front 10 feet wide, in which are contained 12 rotating shovels made of the best steel and arranged like an immense fan-wheel. On the front of the shovels are placed 18 two-edged knives of best steel, which reverse automatically. On the frame in the rear of the drum are located the engines and boiler which supply the power to rotate the shovel-wheel, the whole supported by two extra heavy four-wheel trucks.

The cylinders are 17 inches in diameter and 22 inches stroke, of the best iron made for that purpose. The boiler is of the best steel, 7-16 inch thick; cylindrical part 52 inches diameter; there is a wagon-top over the furnace 12 inches higher than the cylinder part, and one dome over the furnace, 28 in. x 28 in.

The fire-box is 69 inches long and 47½ inches wide, inside, of homogeneous cast steel. There are 184 iron flues, 2 inches diameter, 11 feet 2 inches long. The machine is equipped with two injectors; Richardson's balanced slide valves and double eight feed lubricators, and is furnished with gauge lamps, whistle, two safety valves, steam and water gauges, heater and gauge cocks, etc.

The material and workmanship are the same as is usual in the highest standard of locomotive construction.

The boiler and machinery are entirely covered with a substantial ash oah. The front truck is equipped with an extra wrought-iron frame, made fast on the truck frame, for the purpose of carrying the ice cutter and flanger.

The ice-cutter is hung from the forward end of the extra frame, and can be lowered to cut the ice and snow from the inside and off the top of the rails in front of the forward truck wheels, so as to make it impossible to derail the rotary shovel by ice or snow.

The flanger is hung on the rear end of said extra frame, and is so constructed as to cut within one-half inch of the rails on the sharpest curve, and works perfectly, no matter how slow or how fast it is run over the line. It will clean the flange and rail thoroughly in a deep bank or cutting. Both ice-cutter and flanger are raised by a 6x9 steam cylinder.

A number of these powerful machines have been sold and are in operation this winter on the following railroads: Union Pacific, Colorado Midland, Southern Pacific, Oregon R. R. & Navigation Co., Northern Pacific, Denver & Rio Grande, C. & N. W. Ry., O. St. P. M. & O., St. P. M. & M., St. P. & Sta. Marie, D., S. S. & A., N. Y. C. & H. R. R. R., O., M. & St. P., and other lines. They are built by the Leslie Bros. Manufacturing Co., Paterson, N. J., a new company which has taken the place of the Rotary Steam Shovel Manufacturing Co., and will manufacture various other railway appliances.

All through the "Far West" this year heavy snowstorms have been the rule; way down in New Mexico in November last the roads became blocked and a rotary snow-plow had to be sent from Colorado to get the passenger out. This was the case on the Denver, Texas & Fort Worth R. R. The same storm struck the western part of Kansas about the same time, completely blocking the western divisions of the Chicago, Rock Island & Pacific with snow, sand and ice, but the Rock Island Co. had the good fortune to own two rotaries with which they opened their line in as many hours as it would have taken days to have done in any other way, as the plow throws the snow clear away from the track by its operation.

Then the storm seemed to make for the mountains, where it made itself felt from New Mexico to Washington Territory, and clean to the west side of the Sierra Nevada and the

Cascades, not forgetting the Siskiyous and the Shastas. The first mountain road to fall a victim to its fury was the Denver, South Park & Pacific, a part of the Union Pacific system.

For several months back heavy snowslides have been frequent along this line, many of which have exceeded 20 feet deep on the track, and only those who have seen a snowslide in the mountains can realize the hardness of the compact mass the snow is driven into by these terrible slides. Yet the rotary has never failed to cut its way through these slides, only where rocks and trees have been carried down and buried in the solid mass. Notwithstanding the fact that every care has been taken to prevent the rotary from running aback of the rocks, it has been badly damaged on several occasions by coming in contact with such obstructions, buried in the hard-packed snow, making it a very difficult task to keep this line open with but one rotary.

Reports from the Colorado Midland indicate heavy snows on that line also, and notwithstanding the fact that the snow is 13 feet on the level, with drifts much deeper, the officials report that owing to the successful workings of their rotary plow they have not had a train seriously delayed up to the present time.

The Denver & Rio Grande, with two rotaries, kept their line open more successfully than ever before.

While the rotaries were fighting hard in Colorado, the terrible storms in the Sierra Nevada put in an appearance, and for days and weeks the Central Pacific Co. was enabled to keep their line open for traffic with but one rotary plow, which they purchased two years ago and had never had an opportunity of thoroughly testing until the recent storm set in, in the latter part of November last, in the Sierras, where for weeks in succession it scarcely let up for a day, spreading its wings over so much territory and increasing in its fury until it was simply impossible to cover the length of snow-bound track with one rotary, yet for days and weeks the rotary succeeded in conveying the trains backward and forward until snowslides and increased storms completely baffled the efforts of the company to keep the line open with one rotary plow.

This winter has demonstrated to the Southern Pacific Company that had they had a sufficient number of rotary plows, they need not have delayed a train. General Superintendent Fillmore was free to admit in his dispatch of January 24th that if he had had three or four rotaries, instead of only one, little delay would have been caused, and the terrible blockade on their line, during the winter of 1889 and 1890, would have been averted, which is clearly established in his dispatch of January 29th, in which he states that the rotary plow which they borrowed from the Union Pacific, to open the west end of their Salt Lake division, did more work in six hours than it would have taken 500 men to do in one week.

During those terrible storms, the rotary was in continuous service for 14 days and 14 nights, and it will be remembered that when within 300 feet of the end of the great blockade in the Sierra Nevada, the rotary was disabled. This was mainly the result of overjoy and enthusiasm, which was augmented by the cheers of the imprisoned passengers and crews of the snow-bound trains, who had concluded that it was simply impossible to disable the powerful machine. Words can hardly express the excitement and delight of the prisoners, which increased as the wonderful plow advanced, until the engineers on the powerful locomotive behind it gave way to their feelings by blowing their whistles and pulling the throttles wide open, with a view to passing through the last great mountain of snow and raising the terrible blockade with flying colors; but the extra power proved too much, and the rotary, after its gallant fight, was obliged to give way to the enormous strain before the last 200 feet had been cleared.

However, the difficulty was finally overcome, the plow repaired, and another one purchased. Mr. Fillmore's high opinion of the performance of the rotary is fully substantiated by the reports of the officials of the Northern Pacific, who claim that it was owing to the fact that they had a sufficient number of rotaries that they were enabled to run their overland trains through to the coast almost invariably on time, never having had a train more than a few hours late, and very few more than a few minutes.

Equally satisfactory reports of the work done by the rotary are made by the officials of the St. Paul, Minneapolis & Manitoba road on their line.

This is the third winter the rotary has been in use on the Oregon Railway & Navigation Co.'s line. The winter before last they got their first rotary, which proved such a success in the storms that season that they secured a second one a year ago last fall, and they claim that the rotaries never failed to do their work successfully and satisfactorily by keeping their line open for traffic, until they had the misfortune of disabling one of them in the mountains a few weeks ago. In fact it has been a success wherever used this winter.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING FEB. 18, 1890.

- 421,884.—STEERING-WHEEL CARRIAGE—Dan'l Best, San Leandro, Cal.
421,657.—ROTARY JOINT—W. F. Byers, S. F.
421,858.—PENDULUM-BAR TREADLE—E. A. Cochran, Pasadena, Cal.
421,555.—SAWDUST BURNER—F. W. Cook, S. F.
421,675.—HAIR-RESTORER—Crooks & Robin, S. F.
421,880.—WHIFFLETREE CONNECTION—O. J. Fisk, Coulterville, Cal.
421,495.—DRAWHEAD—T. W. Heintzelman, Sacramento, Cal.
421,739.—HARROW—H. L. Mack, Ellensburg, Wash.
421,886.—AXLE-LUBRICATOR—R. H. Parker, Carson, Nev.
421,881.—RAISIN-GRADER—Jas. Porteous, Fresno, Cal.
421,609.—SHIFTER FOR GANG-EDGERS—S. H. Pratt, Brownsville, Cal.
421,610.—JOURNAL BOX PROTECTOR—H. S. Pugsley, Oakland, Cal.
421,617.—PRINTERS' GALLEY—W. S. Rogers, Los Angeles, Cal.
421,882.—VISUAL ANNUNCIATOR FOR CALL-BOXES—Paul Seiler, S. F.
421,883.—MIXING APPARATUS—Geo. W. Swan, S. F.
421,453.—CUT-OFF VALVE—C. W. Tremain, Portland, Or.
421,877.—DUPLEX LEDGER-RULER—S. B. White-side, Los Angeles, Cal.
421,800.—MOUTH-PIECE FOR TELEPHONES—Whitney & Cowles, S. F.
421,885.—GUIDING ATTACHMENT FOR AGRICULTURAL IMPLEMENTS—C. W. Packard, Fresno, Cal.
17,541.—TRADEMARK, Callisto Co., S. F.

FOR THE WEEK ENDING FEB. 25, 1890.

- 422,329.—OIL BURNER—J. F. Beals, Los Angeles, Cal.
422,047.—BURGLAR-PROOF CAR—J. Beermaker, Santa Barbara, Cal.
422,283.—NECKTIE FASTENER—H. Berchling, Roslyn, Wash.
422,070.—WATER FRONT ATTACHMENT FOR BOILERS—J. T. Charest, Red Bluff, Cal.
422,124.—DRIVING REIN—M. S. Dickinson, Los Angeles, Cal.
422,013.—CANNON-WHEEL REMOVER—H. R. Eckstrom, Santa Rosa, Cal.
422,203.—BEVERAGE CARBONIZER—C. W. Gibson, S. F.
421,932.—BULLET—W. A. Heisler, Prescott, A. T.
422,131.—SHOE LACER—A. C. James, Pomona, Cal.
422,086.—VARIABLE CRANK FOR VELOCIPEDES—H. E. Lewis, Gold Hill, Nev.
422,275.—CARRIAGE JACK—T. L. Williams, Big Bend, Cal.
422,104.—DEVICE FOR LAYING OUT ORCHARDS—J. B. Yount, Dixon, Cal.

The following brief list by telegraph, for March 4, will appear more complete on receipt of mail advices:

California—Joseph R. Trico, assignor of a half to H. C. Owens, San Francisco, photographic shutter; Joseph Tomlinson Sr., Folsom, wrench; John Schroeder, S. F., gaiter boot; Almeroy W. Schmidt, S. F., shell for high explosives; Judson Rice, San Jose, heating apparatus for dissolving bituminous rock; William Pierce, Napa, gate; Eugene C. Merrill, West Oakland, car-lock; Elmer C. Jordan, Sacramento, circulator and feedwater heater; Jason W. Fairchild, Pacific Beach, quartz-mill; Emma P. Bais, S. F., polishing powder; Walter H. Eager, S. F., knife-box rubber for printing presses; T. C. Churchman, Sacramento, car-wheel and axle; Joseph Behm, San Jose, centrifugal polisher; William A. Beck, S. F., fruit-drier; F. W. Beardslee, Berkeley, farm gate.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

VARIABLE CRANK FOR VELOCIPEDES.—Hiram F. Lewis, Gold Hill, Nev. No. 422,086. Dated Feb. 25, 1890. This is a mechanical movement in that class in which a crank having a variable or eccentric throw is employed. The invention consists essentially in a lazy-tongs connected at one end about the true center of motion and carrying in the other end the crank-pin and an eccentrically located lever connected with said lazy-tongs whereby they are extended and contracted, and their crank-pin thus made to move in an eccentric course. The object is to provide a crank movement of this character for use in connection with any machine to which it may be found applicable, but especially in connection with foot-power machines, such as bicycles, tricycles and velocipedes generally. Its advantage is in saving lost motion by reducing the distance of movement at the same time that the length of crank may be increased to give the necessary or desired power.

CANNON-WHEEL REMOVER.—Harry K. Ekstrom, Santa Rosa, assignor of one-half to Adolph F. Guio, Los Angeles. No. 422,013. Dated Feb. 25, 1890. The cannon-wheel of a clock is forced upon its post outside of the frame-work and so close to the plate that it is very difficult to insert a tool beneath it or remove it without damaging the teeth of the wheel, bending the post or springing the frame.

This invention relates to a device for conveniently removing this "cannon-wheel" from its post in clocks.

DEVICE FOR LAYING OUT ORCHARDS.—John B. Yount, Dixon, Solano Co. No. 422,104. Dated Feb. 25, 1890. This is a mechanical device for laying out orchards and for other like work. It consists of a mathematically adjustable frame with devices whereby stakes may be set, the holes made and the trees set in mathematical lines and in a perfectly vertical position. In laying out orchards, it is especially desirable that the trees should be so set with relation to each other as to form rows in several directions from any given point, with open roads or spaces between them for the purpose of cultivation, to gather fruit and for symmetrical appearance. This appliance lays out these spaces accurately.

WATER FRONT ATTACHMENT FOR BOILERS.—John T. Charest, Red Bluff, assignor of one-third to Joseph Marcott, San Jose. No. 422,070. Dated Feb. 25, 1890. This water-front attachment for boilers consists of an independent furnace front, which may be built into the usual brickwork of a stationary boiler, said front being made hollow, so as to contain water, and having pipes connecting its upper part with the boiler or boilers, cocks by which connection may be cut off or regulated at pleasure, tubular grates connected with the lower part of said front, and a water-supply pipe delivering water through the tubular grates, and also directly into the lower part of the front and through the bridge wall. The water becomes considerably heated by reason of the fire upon the inner wall of the furnace-front and upon the bridge wall, and the whole device serves as a water-heater, utilizing a considerable amount of heat from the furnace to raise its temperature to the proper point before its delivery into the boiler.

The Mining Bureau Museum.

The following are some of the recent additions to the collection of the State Mining Bureau: Polished quartzite, from Sioux Falls, S. D., which is quarried in large quantities and sold under the trade name of "Sioux Falls Jasper," from J. W. Foss.

Embolite (chloro-bromide of silver), Broken Hill, Australia, from Louis Janin.

Selenium, a very rare mineral, from Honduras—Charles Thistlewaite.

Topaz (group of crystals), Japan—J. Z. Davis.

Celestine (sulphate of strontium), or Colemanite, from Calico, San Bernardino county, California.

Rich silver ores from Sinaloa and Durango, Mexico, and iron ore with iron made from it, from an immense deposit in Durango, on which extensive works have been erected for the manufacture of iron—C. A. Hamilton.

Native mercury and rich cinnabar from Pine Flat, Sonoma county, California—C. A. Grimmer.

Huanjavita (argenteriferous halite), Tarapaca, Chile—M. Rosenstock.

Embolite, from same place—M. Rosenstock.

Gold quartz, Elkhorn mine, Oregon, assaying \$400 per ton—J. H. Robbins.

Gold in hematite, Golden Era mine, Sierra City, Sierra county, California—Thomas Murphy.

Anthracite coal, Cloquato, Washington—H. C. Davis.

Silver ores, from San Bernardino county, California.

A FIRE has broken out on the old slopes of the 1000-foot level of the Silver King mine, Arizona. A hulkhead has been put up cutting off that portion from the rest of the mine.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. C. HOAG—San Francisco.
R. G. BAILEY—San Francisco.
W. W. THORNTON—Los Angeles Co.
E. FISCHER—Central California.
Geo. WILSON—Sacramento Co.
E. H. SCHAEFFLE—Calaveras Co.
FRANK S. CHAPIN—Colusa Co.
ISAAC AYER—Fresno, Cal.
SAMUEL CLIFF—San Luis Obispo Co.
W. H. HILLARY—Oregon.
E. E. DRINKING—Oregon.
CHAS. M. MOODY—Oregon.
H. G. PARSONS—Washington.
R. G. HUERTON—Montana.

Successful Patent Solicitors.

As Dewey & Co. have been in the patent soliciting business on this Coast now for so many years, the firm's name is a well-known one. Another reason for its popularity is that a great proportion of the Pacific Coast patents issued by the Government have been procured through their agency. They are, therefore, well and thoroughly posted on the needs of the progressive industrial classes of this Coast. They are the best posted firm on what has been done in all branches of industry, and are able to judge of what is new and patentable. In this they have a great advantage, which is of practical dollar and cent value to their clients. That this is understood and appreciated, is evidenced by the number of patents issued through their SCIENTIFIC PRESS Patent Agency (S. F.) from week to week and year to year.

Attention, Southern California Miners.

WORKS FOR SALE.
The Works are situated at Daggett, Cal., in the Calico Mining District, and on the side-track of the Atlantic and Pacific Railroad. They contain a first-class 50-horse power Engine and 45-horse power boiler, with Ore Crusher and other machinery, Mill Scales, Assaying Outfit, etc., all nearly new. Also upon the premises an office building and a comfortable dwelling-house (portable). The above can be had at a bargain. Apply to GILLISPY & CHILDS, 123 California St., San Francisco.

MARKET REPORTS.

Local Markets.

SAN FRANCISCO, March 6, 1890.
Rainy weather the past week interfered to some extent with distributive trade, but at the close the promise is held out of more settled weather, which will bring in its wake larger business, for stocks of goods carried in the valleys and mountain towns are almost nil. The iron-molders' strike the past week comes very inopportune, and if not soon settled, will send all work East. Foundrymen and manufacturers in general say that we must have cheaper raw material, or else cheaper labor; failing to get either, they must "shut up shop," the same as the woolen-mills are doing.

The local money market is easy, with a lessened call for funds. Remittances from the interior are coming in quite freely, chiefly from up North. The easy money market is being favorably felt in the realty market, and a speculative movement in local securities and a deal pending in some of the mining stocks.

A summary of the dividends for February compares as follows:

	1889.	1890.
Gas and Water companies	\$147,100	\$89,500
Insurance companies	6,000	4,500
Powder companies	27,000	43,800
Street railroad companies	25,000	7,500
Sugar companies	40,000	60,000
Central Pacific Railroad	650,000	650,000
Mining companies	344,250	141,500
Miscellaneous companies	31,250	40,250
Totals	\$1,800,000	\$1,006,050

MEXICAN DOLLARS.—The market has ruled dull but fairly steady throughout the week at 75 1/2 @ 76 cents.

SILVER.—The markets abroad and at the East advanced steadily up to Tuesday, when a shading off set in. The market, as has heretofore been stated would be the case, is being manipulated, by which silver bullion is made an attractive gamble. This promises to be the case while the question is under debate in Congress. It now looks as if the House of Representatives will act favorably, with some amendments on the Windom bill, but what course the Senate will pursue remains to be seen, but it will probably conform to the House bill; at any rate, it is conceded that neither branch of Congress will antagonize the other to such an extent as to defeat more favorable legislation than now enjoyed. It is now officially confirmed what this paper has stated, that China is preparing to issue a silver currency of its own. This ought to hold the market value of the metal.

Silver has held to Mint prices, 95 1/2 cents, the past week, with very little offering for sale. Exporters are still said to be out of the market. Money, a leading English financial paper, just to hand, referring to the Chinese Government scheme to mint silver, says that "should it pass into law, an enormous demand for silver would spring up, which would gladden the hearts of those interested in the depreciated rupee."

QUICKSILVER.—The market has ruled strong throughout the week. The demand for both export and domestic consumption is increasing. Receipts for the past week aggregate 539 flasks, and exports by sea 320 flasks to New York.

BORAX.—Receipts the past week aggregate 209 casks. The market is strong in sympathy with the East, where active and strong markets are reported.

LIME.—Receipts the past week aggregate 3618 bbls., and exports by sea 225 bbls. to Honolulu. The market is steady, with an increasing call reported.

CHROME ORE.—There was shipped the past week 419,000 lbs. to New York. The market is reported unchanged.

COKE.—Imports the past week aggregate 1559 tons. The market is reported fairly steady by some, while others say the tone appears to be weaker.

LEAD.—The market exhibits a stronger tone, in sympathy with an improved demand and better prices at the East. Receipts with us continue light. The past week there was shipped by sea to New York 475 kegs of white lead.

COPPER.—The market continues strong. The consumption on this coast is steadily increasing. A late London cable reports as follows: For copper there has been more demand, and purchases by consumers show some increase. A parcel of 400 tons merchant bars changed hands at £46 12s. 6d., and several smaller parcels at £46 10s. @ £47. Speculative demand has improved, and appears to be encouraged by the easier rates for money. The demand from consumers is improving, and prospects are considered favorable for a good spring trade. It is understood that the principal French holders have decided not to realize at less than £50, it being considered very likely that prices will recover, in view of the fact that North American supplies are small and that a good part of the French holdings will be wanted for consumption by present owners.

TIN.—Imports the past week aggregate 56,380 boxes plate, and exports by sea 4981 lbs to Victoria and 60,000 lbs to Santa Rosalia. The market for both plate and pig is quiet and in buyers' favor. This condition will obtain until there is a better concentration, which promises to be soon. The following is a late London cable to the *Iron Age*: "In tin plate business has been small, and Liverpool buyers are gradually tapering prices. The half-yearly meeting of the Plate-Workers Union was held Saturday, and 103 delegates, representing 72 works, were present. It was decided to cease work altogether during the second week in March, and every effort will be made to adhere to 36 boxes output in 8 hours until the stock at shipping ports shall have been reduced to 250,000 boxes. During the week previous to the meeting, makers closed 70 mills, including those of the Baldwin, Williams, Coway Bros., Lewis, Thomas, German, Fairwood, Trefores, Barry and Oldcastle Companies."

IRON.—Imports the past week quite heavy, being as follows: From Newcastle, 500 tons; Cumberland, 450; Liverpool, 36; and New York, 90; total, 1077 tons. The market appears to be unsettled, with probably an easier tone, owing to the labor strike. If this is amicably settled, or non-union

hands be employed, then prices will not go off, but if not settled, then it is quite certain there will be more or less realizing sales. European and Eastern advices report the market firmer at the recent shading in prices.

COAL.—Imports the past week aggregate as follows: Departure Bay, 3156 tons; Coos Bay, 1150; Nanaimo, 2456; Egg, 52; Newcastle, 2697; total, 9511 tons. The market for Australian spot, to arrive and for shipment, is very strong. There are only four cargoes on the way, and very few vessels to load for this port. As the wheat crop is shorter than before estimated, it is thought that freights for summer loading will be lower. Carriers, sellers' option for shipment the year, can be bought fully 1/2 below our quotations but for prompt shipment no concessions are obtained. Coast coals are more strongly held, with an advance talked of, chiefly for Wellington. The consumption of steam is increasing.

Eastern Metal Markets.

By Telegraph.

NEW YORK, March 6, 1890.—The following are the closing prices the past week:

	Silver in New York.	Copper.	Lead.	Tin.
Thursday	95 1/2	14 55	8 75	20 80
Friday	95 1/2	14 55	8 75	20 80
Saturday	95 1/2	14 55	8 75	20 80
Sunday	95 1/2	14 55	8 75	20 80
Tuesday	95 1/2	14 55	8 75	20 80
Wednesday	95 1/2	14 55	8 75	20 80

NEW YORK, March 6.—Lead is firm and higher, with a good demand ruling. Tin has fluctuated the closing week. Quicksilver is higher and strong. Borax, supply light, market strong. Copper is firm, with moderate demand; 14 1/2 @ 14 3/4; Spot Lake, 12 1/2 @ 13 c. Casting brands—Liberal sales reported. West, 14 1/2 c. intended for this point.

San Francisco Metal Market.

WHOLESALE.	
THURSDAY, March 6, 1890.	
ANTIMONY—	25 00
BORAX—Refined, in carload lots	7 1/2
Powdered	7 1/2
Concentrated	6 1/2
All grades jobbing at an advance.	
COPPER—	
Boat	23 00
Sheeting	23 00
Ingot, jobbing	17 00
do, wholesale	16 00
Fire Box Sheet	23 00
LEAD—Pig	4 00
Bar	5 00
Sheet	7 00
Pipe, discount 10% on 300 bags	1 45
Shot, discount 10% on 300 bags	1 45
Buck, 30 bag	1 65
Chilled, do	1 85
TINPLATE—B. V., steel grade, 14x20, to arrive	4 80
B. V., steel grade, 14x20, spot	4 70
Charcoal, 14x20	6 75
do, roofing, 14x20	6 00
do, do, 20x28	12 00
Pig tin, spot, 30 lb.	22 00
Canton tin, 30 lb.	13 50
Do, do, to load	14 50
QUICKSILVER—By the flask	50 00
Flasks, new	35 00
Flasks, old	35 00
CHROME IRON ORE, 30 ton	10 30
IRON—Bar, base	3 00
Norway, base	4 10
STEEL—English, lb.	16 00
Pick and Hammer	9 00
Black Diamond tool	8 00
Pick and Hammer	8 00
Machinery	4 00
Toe Chalk	4 00
IRON—Cleveland ton	35 00
Eginton, ton	35 00
American Soft, No. 1, ton	35 00
Oregon Pig ton	35 00
Pug's Sound	35 00
Clay Lane White	27 00
Shotts, No. 1	35 00
Bar Iron (base price) lb.	35 00
Langdon	34 00
Thompson	34 00
Cartbarrie	34 00
Barrow	34 00
Thomas	34 00

Coal.

Per Ton.	
Australian	7 50 @ 7 75
Liverpool	8 00 @ 8 25
Scottish	8 00 @ 8 25
Cardiff	9 50 @ 10 00
SPOT FROM YARD.	
Wellington	9 00
Greta	8 00
Westminster	9 00
Nacoma	9 00
Sydney	8 00
Gilman	7 00

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, department 10, San Francisco:

MOHAWK CANAL AND IMPROVEMENT CO., March 4th. Object, to take possession of and operate the Mohawk canal, situated in the Mohawk valley, A. T. Capital stock, \$1,000,000. Directors—R. H. McDonald, Frank V. McDonald, D. S. Dorn, R. J. Davis and Dr. John C. Spencer.

OCEAN POWER CO., March 5th. Object, to utilize wave and wind power. Capital stock, \$12,500,000. F. H. Hausman, W. H. Masterman, B. S. Taylor, H. Wangenheim and H. E. Thomas are the Directors.

STATE DIME SAVINGS BANK OF S. F., March 5th. Capital stock, \$200,000. Directors—O. E. Moore, A. A. Hoyt, E. W. Bushnell, M. S. Moore, W. B. Benchley.

CALIFORNIA MANUFACTURING CO., March 5th. Capital stock, \$250,000. Directors—Norman E. Colt, Thomas A. C. Dorland, John T. Carothers, Emil Kamel and D. L. Bishop.

OAKLAND INVESTMENT CO. Object, to deal in real estate. Capital stock, \$150,000. Directors—W. J. Dingee, W. G. Henshaw, Henry R. Miller, C. Finkham and D. D. Harris.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:
Mount Diablo, March 5, \$6515; Justice, 5, \$2863; Hanauer, Feb. 26, \$2700; Ontario, 26, \$43,474; Germania, 26, \$3872; Hanauer, 7, \$4650.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	NO. AM'T.	LEVIED.	DEBITED.	SALE.	STOCKHOLDERS.	PLACE OF BUSINESS.
Adelaide Copper M Co.	Nevada.	1.	1.	Dec 31.	Feb 17.	W. H. Graves.	428 Sansome St.
Baltimore M Co.	Nevada.	6.	20.	Jan 17.	Feb 21.	A. K. Grim.	402 Montgomery St.
Bechtel Cons M Co.	California.	11.	10.	Feb 10.	Mar 17.	C. C. Harvey.	303 California St.
Butte King M Co.	California.	1.	30.	Feb 13.	Mar 20.	W. O. Lewis.	723 Market St.
Camp Creek M & N Co.	California.	1.	2.	Dec 30.	Feb 12.	A. S. Folger.	218 Montgomery St.
Con St Gothard M Co.	California.	1.	5.	Jan 14.	Feb 17.	T. Wetzel.	522 Montgomery St.
Crocker M Co.	Arizona.	8.	10.	Jan 20.	Mar 5.	M. R. Messer.	303 Montgomery St.
East Best & Belcher M Co.	Nevada.	1.	25.	Feb 11.	Mar 14.	C. H. Mason.	331 Montgomery St.
Elk Creek M Co.	California.	1.	3.	Feb 21.	Mar 5.	W. H. Hulse.	224 Montgomery St.
Granite M Co.	Nevada.	24.	30.	Jan 27.	Mar 5.	R. R. Grayson.	327 Pine St.
Gray Eagle M Co.	California.	16.	4.	Jan 21.	Feb 25.	J. M. Buttington.	303 California St.
Happy Valley Bl. Crayal Co.	California.	6.	5.	Feb 12.	Mar 24.	D. M. Kent.	330 Pine St.
Marion White M Co.	Nevada.	23.	25.	Feb 12.	Mar 31.	A. B. Cooper.	325 Montgomery St.
Occidental Cons M Co.	Nevada.	2.	25.	Jan 20.	Feb 25.	A. R. Dunbar.	303 Montgomery St.
Russell R & M Co.	California.	6.	5.	Jan 13.	Feb 17.	J. Moritz.	303 Montgomery St.
Silver King M Co.	Arizona.	2.	33.	Jan 15.	Feb 26.	W. A. Waterman.	309 Montgomery St.
Standard Cons. M Co.	California.	2.	25.	Mar 4.	Apr 14.	J. W. Pew.	310 Pine St.
True Cons M Co.	California.	8.	25.	Jan 18.	Feb 15.	J. C. Bates.	434 California St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING DATE
Alabama Bailey and Humboldt M Co's.	Nevada.	A. W. Wilson.	302 Montgomery St.	Annual, Mar 10
Bullion Beck and Mt M Co.	Nevada.	A. Badollet.	522 Montgomery St.	Annual, Mar 19
California Iro. & Steel Co.	California.	P. Bonadina.	325 Montgomery St.	Annual, Mar 21
Evening Star M Co.	Nevada.	J. J. Scoville.	349 Montgomery St.	Annual, Mar 21
Hale & Norcross M Co.	Nevada.	A. B. Thompson.	306 Montgomery St.	Annual, Mar 16
Potosi M Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	Annual, Mar 12
Virginia Cons M Co.	Nevada.	R. O. Chubb.	147 Fifth St.	Annual, Mar 11

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Champion M Co.	Nevada.	T. Wetzel.	522 Montgomery St.	10.	Jan 20
Caledonia M Co.	Nevada.	A. S. Cheminist.	328 Montgomery St.	10.	Jan 20
Con California & Va M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	25.	Jan 20
Derbee Blue Gravel M Co.	California.	T. Wetzel.	522 Montgomery St.	10.	Dec 23
Idaho M Co.	California.		Grass Valley.	2 50.	Mar 7
Mt Diablo M Co.	Nevada.	R. Housh.	318 Montgomery St.	30.	Oct 27
Pacific Borax Salt & Soda Co.	California.	A. H. Clough.	230 Montgomery St.	1 00.	Feb 10

Sales at San Francisco Stock Exchange.

THURSDAY, Mar. 6, 9:30 A. M.	
130-Hale & Nor.	2.40
300 Justice.	1.40
100 Alta.	1.20
100 Andes.	1.50
100 New York.	3.25
300 Belcher.	1.60
100 Best & B.	1.25
300 Bullion.	1.00
100 Chollar.	1.00
200 Commonwealth.	3.50
600 Con. Imperial.	1.50
300 Crown Point.	1.50
50 San Va. & Cal.	1.40
100 Grand Prize.	2.20

Mining Share Market.

The mining share market the past week for the Comstocks was quieter at gradually settling prices, with on Wednesday a setback of from five to ten per cent. The decline was very generally looked for, yet it was not as heavy as the points were out for. Those who had watched the upward movement in the North End stocks were prepared for a decline, as the advance was made chiefly on shorts and also for the purpose of buying stocks, both of which were successful. To keep the public from buying and at the same time induce those who have stocks to sell out, assessments are being levied. Those of the outside who carry stocks might as well make up their minds to let go, for the pool wants a part, if not all they hold, and the sooner the pool gets them, the better it will be for all in interest. If stocks cannot be secured through manipulation worked by points, then probably the old deadlock racket, with plenty of assessments, will be put in force, which soon fetches what is required. Outside of this, the situation at the mines is far more encouraging than for years past, and if desired by the pool, there can be no doubt but one or more rich ore bodies can be shown up. The Tuscarora stocks are very active; they show an unusual degree of vitality, and by their fluctuations offer special inducements to speculators, yet the moneyed public are afraid of them, owing to the ore veins being quite narrow, and not extending down in sufficient width to any great depth to justify working below certain levels. Another thing against them is the discount on silver. Upon the bullion, a little over \$109,000, sold in last month by the Commonwealth Mining Co., was over \$57,000. This gives an idea of one of the serious disadvantages under which the Tuscarora pool labor in their attempt to market their stocks. The Quijotas and the Bodie remained at blackboard prices.

In reply to a patron, we will state that the increase in Bodie surplus cash is due to the remittance by the company's New York agent of money collected on the last assessment. The amount received indicates that about 30,000 shares are held in New York City.

The superintendent of the Andes Mining Co. reports two miners at work. These two forlorn men must have a hard time in allowing a sufficient excuse for the following officers' salaries to be paid regularly: President, secretary, superintendent, foreman, engineer, carman and watchman; no wonder the assessments roll around as regular as clock work.

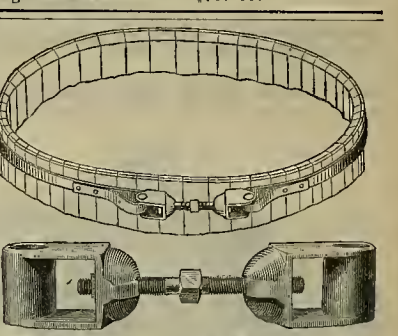
Official advices from the Bodie mine report that the water is on the 900-foot level, which level in consequence is abandoned. If the water continues to rise, the mines will be forced to work on the surface.

From the mines we are unable to get any very reliable private news. The center of attraction now appears to be the Ward shaft and adjoining mines, Seg. Belcher. On the 550-foot level in Ward shaft they are reported to be drifting to make connection with Potosi with every prospect as the work progresses, of running into a body of rich ore. In Potosi an upraise from the 930 level has for two weeks past been in ore assaying over \$25 a ton. In Belcher and Seg. Belcher the work is of a very important character. Both Potosi and Belcher will be assessed probably to counteract any improvement that may be reported in the mines. More active prospecting work is under way in Hale & Norcross. In Union to the East they ran into rich ore; probably this brought out the assessment. All mills on Carson river are running full time. This month's bullion output of Savage, Hale & Norcross, Crown Point, Overman and Chollar, will be larger than for years. The managers of Overman are officially reporting the car samples assays of ore. This is as it should be. Other companies might, with credit to themselves, do likewise. From the Quijotas mines there is nothing new to report. From the Bodies, our private advices are very encouraging regarding the work going on in Bodie on the 700 and 800-foot levels. It now begins to look as if something of value is liable to be run into. From the Tuscaroras our news is of the very best and accounts for the activity in the stocks.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Feb. 13.	WEEK ENDING Feb. 20.	WEEK ENDING Feb. 27.	WEEK ENDING Mar. 6.
Alpha.	.95	1.00	.95	1.00
Alta.	1.25	1.10	1.25	1.30
Andes.	.45	.50	.45	.50
Belcher.	1.70	1.80	1.85	1.90
Best & Belcher.	2.70	2.80	2.70	2.80
Bullion.	.60	.65	.55	.60
Bodie Con.	.50	.45	.45	.50
Bullion.	.20	.25	.25	.20
Commonwealth.	3.40	3.55	3.40	3.50
Con. Va. & Cal.	4.65	4.75	4.70	4.80
Challenger.	1.30	1.40	1.50	1.75
Chollar.	2.40	2.75	2.40	2.60
Con. Imperial.	.25	.30	.30	.30
Caledonia.	.20	.20	.20	.25
Crown Point.	1.55	1.65	1.55	1.60
Crocker.	.15	.20	.20	.35
Hale & Norcross.	2.75	3.00	2.75	2.90
Del Monte.	.25	.30	.30	.40
Idaho.	.30	.30	.30	.35
Justice.	1.25	1.30	1.25	1.40
Kentuck.	.70	.65	.70	.75
Lady Wash.	.25	.25	.30	.30
Moco.	.35	.40	.40	.45
Mexican.	2.65	2.80	3.05	3.00
Navajo.	.30	.45	.30	.40
North Belle Isle.	.70	.80	1.10	1.15
New Queen.	.45	.75	.80	.90
Occidental.	.60	.65	.65	.70
Overman.	8.60	8.60	8.60	8.60
Potosi.	1.00	1.10	1.10	1.25
Perris.	1.00	1.00	1.75	1.75
Peer.	.20	.25	.25	.25
Savage.	1.55	1.70	1.75	1.80
S. B. & M.	1.45	1.60	1.51	1.60
Sierra Nevada.	1.90	2.00	2.40	2.30
Sierra Nevada.	1.90	2.00	2.40	2.30
Scorpion.	.25	.25	.35	.20
Union Con.	2.25	2.35	2.80	2.35
Utah.	.65	.60	.70	.60
Yellow Jacket.	1.50	2.00	2.15	2.45

The yield of gold mines in Kern county during 1889 is estimated at \$75,000.



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A MIDDLE-AGED MAN BY THE NAME OF JOSEPH McLEARN, Miner, left Nova Scotia 17 years ago for California. His friends would be thankful to any person who could give any information concerning his whereabouts.

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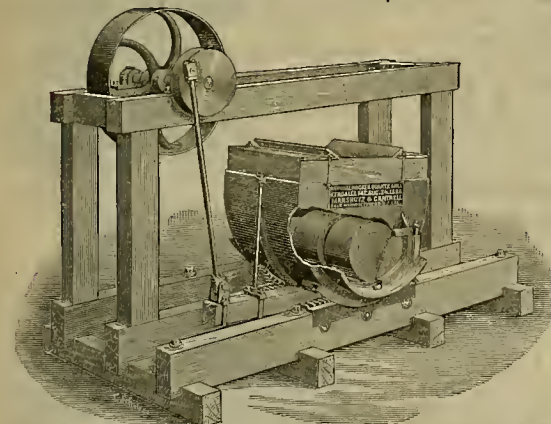
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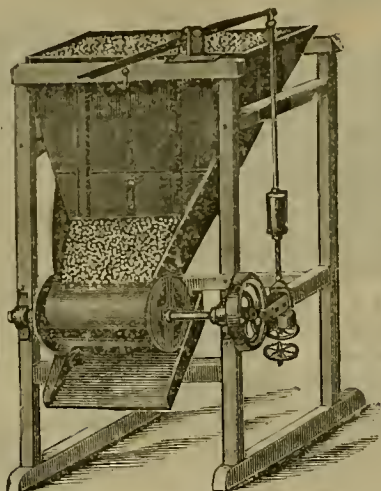
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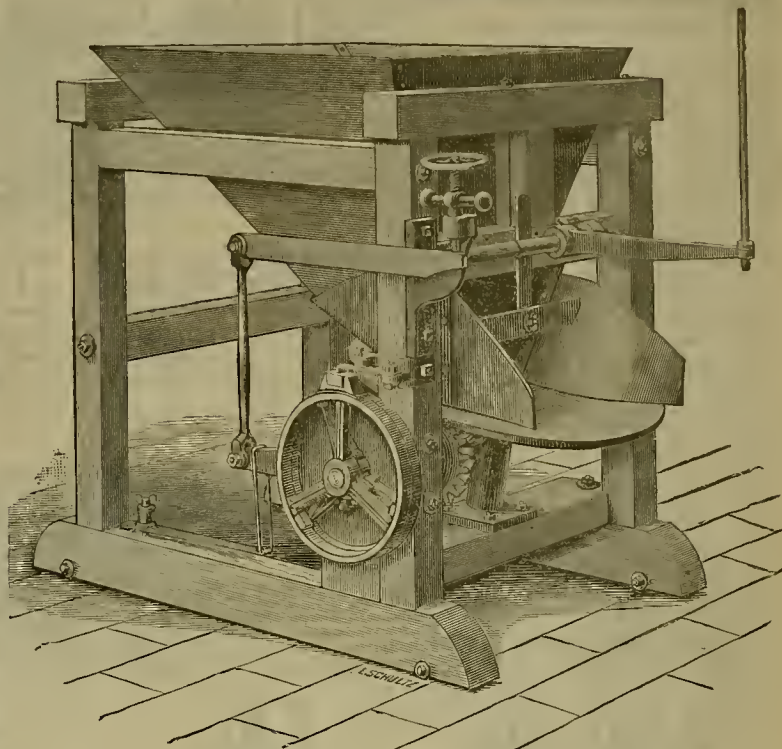
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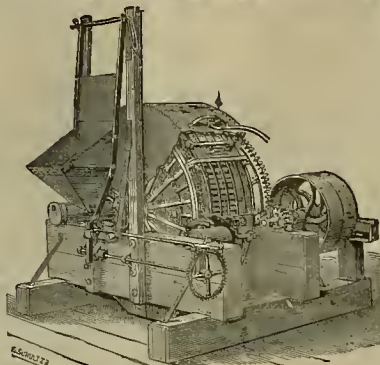
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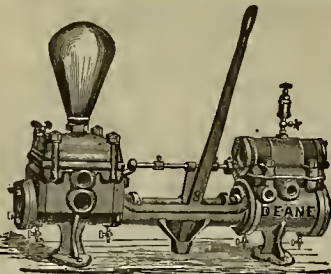
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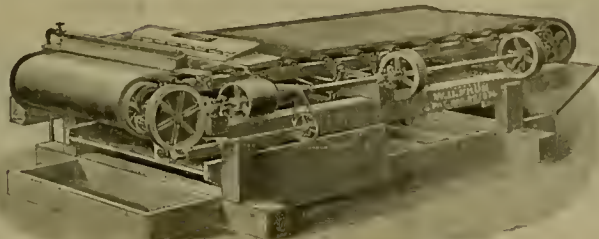
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Protected by Patents December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883; July 24, 1888. Patents applied for.

There are Over 2200 Plain Belt Machines now in Use.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.
DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 30 more of your machines for immediate delivery. Yours truly, THE MONTANA COMPANY (Limited).

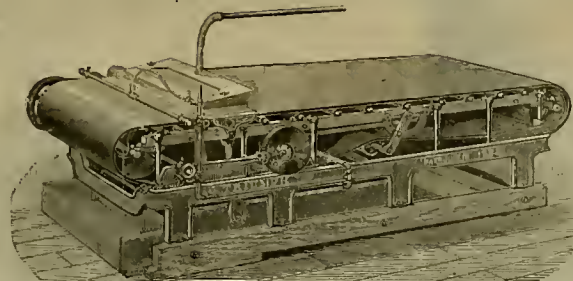
N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

"TRIUMPH" ORE CONCENTRATOR WITH IMPROVED RIFFLED BELT.

The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frue" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frue" Vanner is the best ore concentrator in the market. The fact that the "Frues" have improved (corrugated) belts does not militate against the superiority of the "Triumphs;" for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.

Price "Triumph" Concentrators, with Improved (Patented) Belt - - - \$650 f. o. b.
Price "Triumph" Concentrators, with Plain Belt - - - \$550 f. o. b.

We are prepared to guarantee the superiority of the "Triumph" over the "Frue" or any other form of Concentrator, for coin if need be. Circulars and testimonial letters furnished on application.



JOSHUA HENDY MACHINE WORKS,
39 to 51 Fremont Street, San Francisco, Cal.

(PATENTED.)

Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

Original Empire Mill and Mining Company,
Principal Office, 401 California St., cor. Sansome, S. F.
Location of Works, Orass Valley, Nevada Co., Cal. }
ORASS VALLEY, NEVADA CO., CAL., Nov. 10, 1885.
Joshua Hendy Machine Works, 39 to 51 Fremont St., S. F., Cal.:

GENTLEMEN—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.

At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrators is the equal, if not superior to any other style of Vanners or concentrating devices. DAVID McKAY, JR.,
[Signed] Sup't North Star and Original Empire Mining Co.

N. B. When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.



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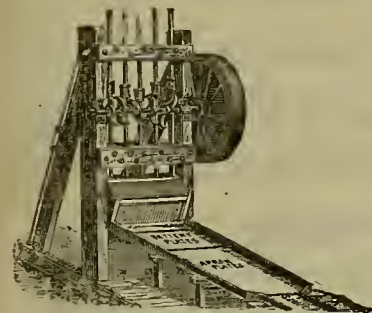
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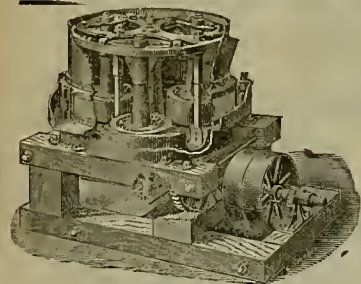


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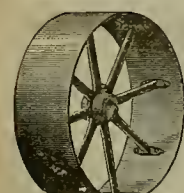
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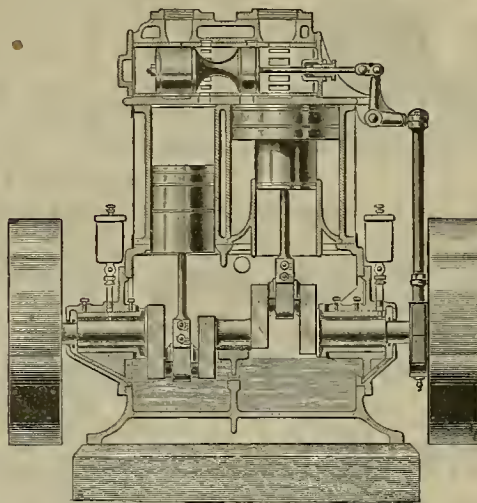
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

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SAN FRANCISCO, SATURDAY, MARCH 15, 1890.

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Marble.

Owing to the violent geological agencies which have been in operation since the formation of the marble deposits in California, the stone is found broken and shattered in many cases, so it is difficult to obtain pieces of large size free from cracks. This is the case in some of the deposits in Kern, Los Angeles, Monterey, Nevada and Plumas counties. In some other places, however, good quarries are found, notably in Inyo county, where the quarry is turning out good marble in blocks of any required size. Some found near Teheocapai, Kern county, and some from near Colfax, Nevada county, is also good.

Vermont is the leading marble producing region of the United States. There are in that State immense beds of great thickness. The stone occurs in beds usually but a few feet in thickness, which vary considerably in color, so that several grades, from pure white through greenish, bluish, and almost black, may be taken from the same quarry.

As a rule the best marbles in Vermont occur where the bedrock strata stand at high angles, as at West Rutland. The quarries themselves at this village lie along the western base of a low range of hills, which, to the ordinary observer, give no sign of the vast wealth of material concealed beneath their gray and uninteresting exterior. In quarrying, the best beds are selected, and upon their upturned edges excavation is commenced, first by blasting, to remove the weathered and worthless material, and afterward by channeling, drilling, and wedging; no powder being used lest the fine massive blocks become shattered and unfit for use. The quarry thus descends in the form of a rectangular pit, with almost perpendicular, often overhanging, walls, to a depth of sometimes more than 200 feet, when the beds are found to curve to the eastward and pass under the hill, becoming thus more nearly horizontal; in following these the quarry assumes the appearance of a

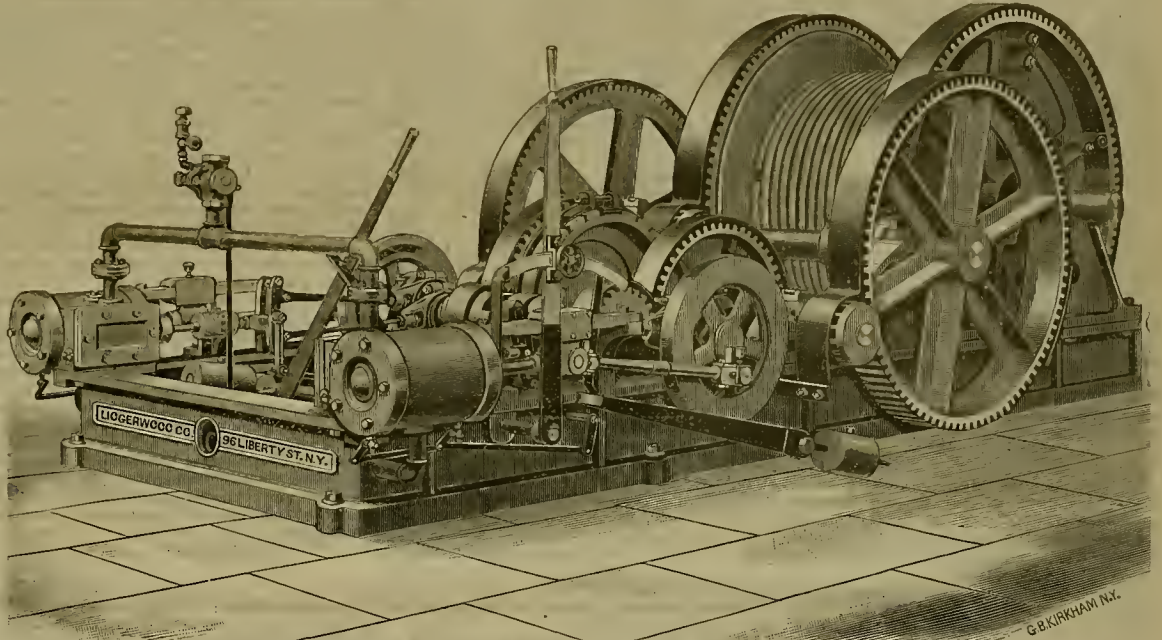
vast cavern from whose smoke-blackened, gaping mouths one would little suppose could be drawn the huge blocks of snow-white material lying in gigantic piles in the near vicinity.

An interior view of a West Rutland marble quarry is shown on this page. It was drawn from a photograph, and we reproduce the view from Geo. P. Merrill's report on "The Building and Ornamental Stones in the U. S. National Museum."

Some of the quarries have been partially roofed over to protect them from snow and rain, and seem like mines rather than quarries. The scant daylight at the bottom is scarce

sufficient to guide the quarryman in his work. As one peers cautiously over the edge into the black and seemingly bottomless abyss, naught but darkness and ascending smoke and steam are visible, while his astonished ears are filled with such an unearthly clamor of quarrying machines, the puffing of engines, and the shouts of laborers, as is comparable with nothing within the range of our limited experience.

The stone taken from the quarries is worked up in the companies' shops in the immediate vicinity or shipped in the rough as occasion demands. The supply is used for monumental, decorative or statuary work and general building.



THE LIDGERWOOD IMPROVED QUARRY HOISTING ENGINE.

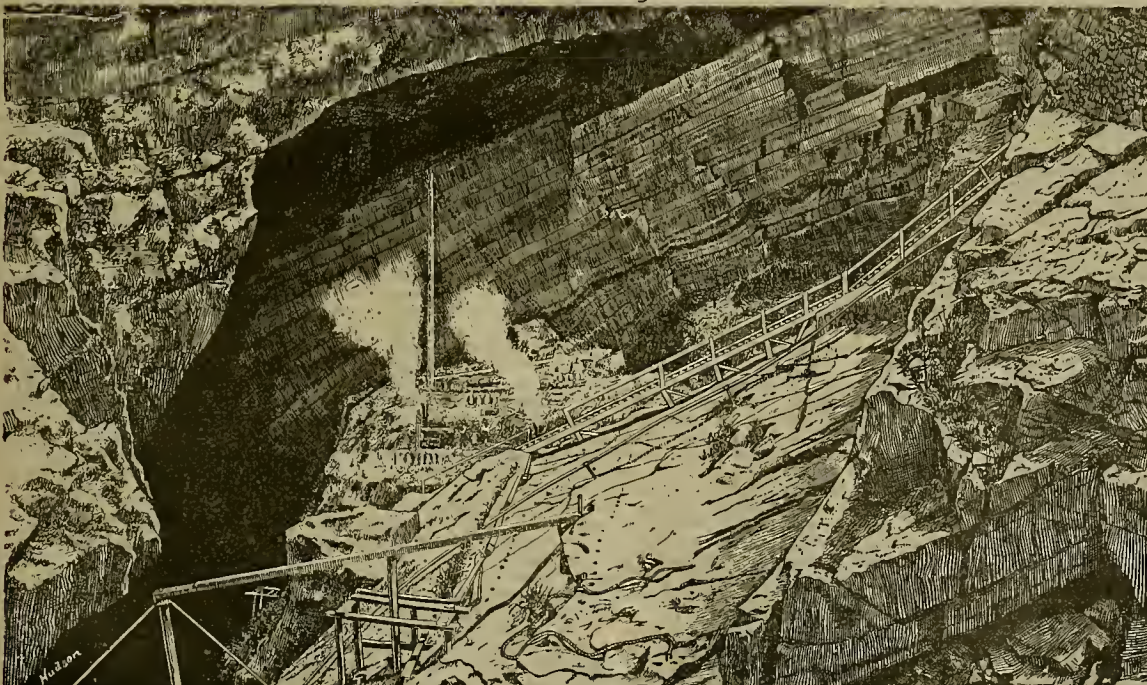
An Improved Quarry Hoisting Engine.

The Lidgerwood Manufacturing Company of 96 Liberty street, New York City, manufacturers of hoisting machinery, are making an engine specially designed and adapted for heavy hoisting purposes in quarries, etc., known as their Improved double-cylinder reversible link motion hoisting engine. The engraving on this page will give our readers a good idea of the general style and appearance of this machine. Its construction embodies all the latest improvements made in the well-known Lidgerwood type of hoisting engine, and its design is based upon the suggestions of the most experienced quarrymen in the country. The Lidgerwood Manufacturing Co. claim it is the most perfect and complete engine ever built for quarry-hoisting. It does away with the complicated system of blocks, saving time and trouble, as the hoisting is done with a single direct line.

The engines are of the Improved double-cylinder reversible link motion type, with throttle valve connection, mounted upon an extra strong and solid cast-iron bedplate, and are handled by simply moving the upright lever to start, stop and reverse them. The drum shaft is of hammered steel and the drum is of cast iron turned off true and smooth, of large diameter and is extra heavy and substantial. It is connected with the engine through a train of gearing of great strength, which on the drum and intermediate shafts is double, thus equalizing the strain and decreasing the wear. A powerful foot-brake is applied which will hold any load the engine will hoist. There are two changes of speed, effected by means of a small and a large driving pinion on the crank shaft, either of which may be operated by a clutch between the two, as by moving it along the shaft it will engage with either pinion.

The engines are particularly simple in operation, as all that is necessary is to throw the clutch into either the fast or slow speed gear and hoist, hold and lower the stone by simply

(Concluded on page 189.)



INTERIOR VIEW OF MARBLE QUARRY, WEST RUTLAND, VERMONT.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS.

Mines of a Rainless Land.

NUMBER III.

Silver and Saltpeter Deposits of Iquique.

[Written for the PRESS by DON JUAN.]

In my last letter of Jan. 4th, I promised to take you through some of the most important mines of Santa Rosa de Terafaca, which I will now do. Santa Rosa is one of the most productive mining camps in Chili. It is situated about 11 miles from Iquique in a southeasterly direction, and about seven miles south of Huantajia. Our way to Santa Rosa is, of course, again over the dreary pampas described in my last letter. Midway between Iquique and Santa Rosa, we pass through El Mineral de Carmen, and here we note the very important mines of La Carmen, La Mina Bandera, Argentina and La Mina Margarita. La Carmen, shortly before my visit, had been bought by an English company. It has been in its day a very productive mine, at one time employing over 500 men, and some very rich ore has been taken out. But the work was prosecuted, as in nearly all these mines, in a very primitive way. All the ore and waste was taken out on the backs of the South American mule—the peon—in sacks made of raw-hides. The Carmen is exclusively worked through a sort of an incline shaft with steps cut in the footwall of the lode upon which the peon wends his weary way, carrying the treasure from the bowels of the earth to the surface. When one looks at the dumps of some of these mines, and sees, as is the case with the Carmen, some 300,000 tons of very low-grade ore, one will hardly believe that all this weight has been carried up hundreds of feet from below on the backs of human beings. But such is the case. Some of these *Chiftons* are in from 800 to 1500 feet, but the vertical depth attained is very moderate compared with distance run. At the time of my visit to the Carmen, the owners were experimenting in the wet sorting of the ore. The water for this process has to be carried on mule-back a long distance, and costs from eight to nine cents per gallon. It was soon found that this was too high a price to pay for water, and the dry method was again resorted to. La Mina Bandera Argentina, a very good mine, is owned by the English Consol of Iquique. It employs about 20 men. It is under the efficient management of Mr. Carbis of Cornwall. It is producing some very high-grade ore of silver, with strong indications of copper being present.

From the Argentina we pass through the Margarita, where we meet Mr. J. C. Jens, M. E., as administrador. This is a new property owned by a Santiago company. The ore is galena and running as high as \$3000 per ton. At present some eight or nine tons per day are extracted and shipped to Iquique. The new shaft which is now being sunk is down 200 feet, and looks more like mining than anything in the vicinity. A *malacata* is now being built, and more men daily put on.

From La Margarita we proceed to Santa Rosa. The first mine here of any note is La Florida, owned by a German company, and employing about 40 men. The shaft is down 300 feet, with 80 feet of east and 60 feet of west crosscut. There is a drift in on the north lode over 600 feet, and on the south lode some 400 feet of drifting has been done. The ore is of very high grade, running up to \$10,000 per ton. The average width of the vein is from 8 to 10 inches. This company is now putting up a 10-horse power boiler and engine and constructing some very good houses for their men and officers.

The next mine visited was La Grande, by far the richest mine in the camp. It is employing about 150 men. The main shaft is down 600 feet, and there are over six miles of workings. At the time of our visit we were shown over \$70,000 worth of ore in the ore-house, over which a guard is kept night and day. The ore is hauled to Iquique three times a week, and a guard is sent along with each cartload, and it is needed, too, in this country. The American Consul, Dr. Merriam, owns a large part of this mine, and it is very good property to have. It has been worked for over 200 years, and is reported to have produced over \$150,000,000. It has in 120 years paid a royalty to the Kings of Spain of nearly \$40,000,000. Next to La Mina Grande is La Mina El Rey, once the property of a Spanish King. It is from this very mine that one of the most magnificent specimens in the Spanish museum at Madrid was taken. Its weight is over 9 quintals, and it has a surface of nearly 3 by 8 feet. I would like to be able to present a specimen like this to your valuable museum of the Mining Bureau at S. F., but am afraid they would be too modest to accept it. El Rey is at present employing only six men, and very little ore is being taken out. The lower workings are in a very bad state, and too dangerous to be reopened. In my next letter I will take you through La Buena Esperanza, also a very rich mine.

COLORADO is to send out a traveling exhibit on the same plan as "California on Wheels."

Butte, Montana.

The Most Extensive Mining District on the Continent.

[Written for the PRESS by R. G. H.]

The continued progress and development of the mines in and around Butte has never been the outgrowth of mining-stock speculation, and in consequence the development has, in many cases, been slow, but the merit of the mines is the only incentive that the miners of Butte care to crowd their muscle against. It is not a case of how many shares of treasury stock can be floated at perhaps one-tenth or one-twentieth of their par value in order to keep up a fine general office and a retinue of salaried officials; but how many tons of ore can be selected and shipped to reduction works and how many ounces of silver will it yield to produce the coin to meet a regular pay-day. This is the basis that most of the remunerative mines of Butte have been operated upon, and I will endeavor to show you in a measure what that progress has been in the past four years.

Four years ago it came in my line of duty as a traveling correspondent for the MINING AND SCIENTIFIC PRESS to furnish you an occasional screed concerning Butte, the many mining enterprises and their plants, etc. The taking up in detail of each company and individual carrying on mines in Butte now would no doubt take up too much of your valuable space, yet a brief description of some of the most important enterprises would be of interest to your readers. The motto of every mining company in the district has apparently been "Excellence," for in all, their shafts have been sunk deeper and widened out to two and three compartments. Levels have been run, I might say, by the mile, ore chutes put in and stopes opened, giving room and place for more men to be operated. Mills have been enlarged and new smelters built and more capacity added to the old ones. Agencies for outside smelting and reduction works have been established and all are doing all their capacity will admit.

The Anaconda, for instance, four years ago, was shipping 1200 tons of ore daily to the smelter. Their capacity to-day is 3000 tons per diem, but on account of the fire in the lower levels of the Anaconda and St. Lawrence mines they are only shipping 1800 tons at the present writing. This all comes from the Chambers Syndicate mines, also owned and operated by that company. In 1886, it was estimated that 3000 men were working in and around the mines of Butte. It is safe to say that that number has fully doubled and every industry in connection has prospered accordingly.

What other mining or manufacturing town on the continent is there that could have two of its most extensive companies closed, as is now the case with the Blue Bird Con. and partially so with the Anaconda Co. and yet scarcely feel the effects?

The Blue Bird Mining Co.'s elegant 90-stamp mill has been closed for months on account of litigation, and the judicial authorities have been in such a turmoil over the disputes in regard to the validity of the late election that many months more may pass before the matter can be properly adjudicated.

A close calculation will show that at least 1000 more men would be required to fill these two vacancies. Many of the old employees of these companies are taking this as a most opportune moment to pay visits back home, East, or in foreign lands. Others who have bought or located properties of their own are profitably filling in the interim in developing their own properties, and as the whole country for a radius of six miles is one continuous network of leads and veins of quartz, they are likely to do full as well as if they continued regularly at wages. The Summit Mining District, as it is called, is a phenomenal one, as there are hundreds of veins of quartz—some large, some small, containing gold, silver and copper in greater or less quantities, silver and copper predominating. Yet almost every mine in the camp carries more or less value in gold.

The railroad facilities are being rapidly increased to meet the very much increased wants in this line, and instead of only having one direct connection east and west there will be three—the great Northern (better known as the Manitoba), the Union Pacific, and within two months the Butte & Gallatin Cut-off will be completed, placing Butte a few miles nearer St. Paul than Helena via the Northern Pacific. Several other roads are making good time heading for Butte. The enormous traffic in merchandise and supplies for the population and mines of Butte and the tonnage of copper matte shipped from here yearly attract the live railroad men, and they are reaching for a share of it.

The mills and smelters at Butte are without exception operated on their own ore, and the leasers for the most part are compelled to ship their ore to outside reduction works. This compels them to pay freight and cost of treatment, and it appears to me that there is here an excellent opportunity for some enterprising man to erect reduction works for custom ores alone. This should be on strictly modern ideas, with a view to save every expense both in handling the ores and supplies, and thus reduce the expense to a minimum, and by reducing the cost of treatment it would bring an enormous amount of ore into market that Butte miners never have touched for the reason that they

could not break it and transport it, pay for treatment and have a margin left.

There is an immense quantity of this character of ore in the camp, and sooner or later some one will inaugurate an enterprise of this kind. I, for one, believe that it will be made a profitable investment, under a level-headed management and with sufficient capital. The railroads have switch-backs and tracks laid now to all the mines that are producing ore in sufficient quantities to make it an object, and the mills in Walkerville that three years ago were paying for teams transferring their coal and salt from South Butte, now have the cars switched right in to their coal and salt bunkers. Of course the railroads do not switch cars up a steep grade for the fun of the thing, yet it is much more economical and convenient than the old-fashioned way. The population is, of course, increasing as rapidly as the prosperity of the district demands. The latest estimates place it between 35,000 and 40,000, and I am of the opinion that it will reach the latter number. From the present outlook, the 1st of January, 1892, will see Butte with over 50,000 people.

The town itself has never had what might be termed a building boom. During the past year many very handsome two and three story brick buildings have been added to the town, and the real estate men are apparently taking hold of home investments. A large amount of building is already in sight for this season. Rates of interest are too high to foster much extravagance of this kind. This has been caused mostly by an uncertain feeling in titles, but since the Smoke House lode matter was settled, there is more firmness in the values here, and if a capitalist or his agent was to locate here with ample capital, he would have no trouble in realizing from 1 per cent to 1½ per cent on his money, and need take no chances on titles whatever—only loan where the title was as good as warranty.

A new water company has made an application to the council for a franchise; a new electric-light company is also about ready for business, and many other new enterprises are being inaugurated, all owing to the continued increase in the ore product and absolute needs of the enlarged commonwealth. The taking out and throwing into the world's wealth coffers of over \$22,000,000 in one year from a low-grade ore camp such as Butte is well known to be, means the disbursement on the spot of an immense sum of money monthly. Most of this finds its way into the channels of trade and creates commercial prosperity.

Roads and Roadmaking.

EDITORS PRESS:—I see by a recent number of the PRESS that the best system of roadmaking is open for discussion. We are muddled in again and the mud-plow is off the track and is laid up for repairs for the time being, and my mind wanders toward roadmaking. It is natural for us when we have had roads to see the necessity of having good roads. Just such a winter as this develops all of the bad places in the roads, and we can see where it is necessary to turn the water from the road and to make ditches for the same. Poor roads may be a blessing to some, but to those who live 12 or 15 miles from a railroad it is quite a hardship to travel through the mud that distance. In the first place, we are all interested in having good roads—not only the country people but those of the city as well. The city man likes to go out in the country for an airing and try his fast horse; so you will observe all are interested more or less.

Now for the best system. I fail to notice any general plan offered as yet, therefore I will make a few suggestions. In the first place, we want a general system to work by. Perhaps the same system would not work well in all sections. In the first place, the county supervisors are supposed to have the control of the finances of the county and to look out for its best interests and apportion the funds to the best advantage. If that is so, then why not devise some general plan for working the roads in each county, and require the road overseers to work to the plan adopted by the board, and not do as we usually do, go as you please? Every road overseer has a plan of his own to work the roads by; in consequence we work to a disadvantage.

In the second place, all new road work should be let by contract to the lowest bidder. If there is half a mile of road to be thrown up and graveled, or a new bridge to be built, let it to the lowest bidder. Plenty of men can be found to take the job and do it according to contract, thereby making a saving to the county, and you would get more road work for the amount of money expended. There are no two roadmasters that work the roads the same way. Some will argue the best way is to gravel the roads without throwing them up first, by dropping the gravel in the center of the road, which has been worn out by travel from one foot to 15 inches lower than the outside of the road. When the rains come the water of course will run to the center and soften the roadbed, and the consequence is that your gravel has gone out of sight and you have nothing to show for your labor and money expended. You can see that kind of work all over this county. It is useless and money thrown away. Such a road will only last for a year or two, then you have to gravel again.

I believe it would be a great saving of labor and money to have some general system to work under. The question might be asked:

What constitutes a good road for all seasons of the year? As far as my observation goes, and I have traveled the roads more or less for the last 60 years, and all kinds of roads at that, the best valley road that I have seen for all purposes is one that has been well graded up in the center, with ditches on each side to carry the water, and culverts whenever necessary to carry the water from the roads. Such a roadbed should then be well graveled. By adopting that plan you will have a dry roadbed at all seasons of the year, and a road that will last for years, with a little care, and it will be a pleasure for the tax-payer to travel over the road and see where he has got good value for the money expended.

I would make another suggestion for county and valley roads, and that is to grade up well—say 30 feet wide from ditch to ditch. This grading should be done in the spring, after the heavy rains are over. It will pack and be in good condition to gravel in the fall before the rains set in. I would drop the gravel a little to one side of the center; by doing so you will have left a good summer track, which horses prefer to travel over during the summer months. This method will be a great saving of gravel, also of horseflesh and shoeing.

The most expensive part of roadmaking is the gravel. It costs from 50 cents to 2 dollars per load, owing to the distance you have to haul. So you see it should be used to the best advantage, and we cannot have good roads in the valley in the winter without gravel.

Danville.

B.

British Columbia Coal.

The British Columbia inspector of coal announces that during the year the following mines have been operated, their respective outputs having been: Nanaimo colliery, 223,870 tons 18 cwt.; Wellington, 273,333 tons; Union colliery, 31,204 tons. The total output of the year was 528,407 tons 12 cwt., the coal on hand on January 1, 1889, having been 10,922 tons. The exports of these collieries were 443,675 tons; home consumption, 124,574½ tons, and on hand 1st January, 1890, a little over 22,504 tons. The statement shows the output and export of coal from 1887 to 1889:

	Output.	Export.
	Tons.	Tons.
1887.....	413,360	334,889
1888.....	480,000	265,714
1889.....	528,407	443,675

The following statement shows the various sources, with quantities, of their supply of coal to the State of California from 1887:

	1887.	1888.	1889.
	Tons.	Tons.	Tons.
British Columbia.....	324,949	345,631	417,904
Australia.....	155,649	271,612	408,042
England and Wales.....	91,238	128,167	32,880
Scotland.....	12,616	16,680	12,727
Eastern States (contract, etc.).....	24,102	30,118	18,950
Puget Sound.....	569,710	568,918	374,614
Coos Bay and Mt. Diablo.....	39,155	81,194	87,000
Japan.....	.....	13,808	1,940
Totals.....	1,217,428	1,418,208	1,351,957

Appended are the respective colliery returns, with a list of questions submitted by the examiners in Nanaimo under the "Coal Mines Regulation Act."

IRON SANDS.—A process for amalgamating the New Zealand iron sand has, a correspondent of the *New Zealand Herald* states, been discovered by Messrs. Minett & Jones. The flux used and the process are, of course, kept secret by the inventors until protection is secured. The process has been a complete success, and had been carefully proved in bulk. Mr. Minett has watched the operation, step by step, himself, and this has been done with the most satisfactory result. A quantity of the calcined iron sand and flux has been brought to Hamilton. These were in pieces about two-thirds the size of a brick, but much lighter, and comparatively porous like coke. When pounded up, the debris readily attached itself to a magnet, which would take up, if worked long enough, the whole of it. The fluxed iron sand is now ready for the blast furnace, and Messrs. Minett & Jones are preparing a temporary furnace, when the fluxed material will be run off into pigs. The correspondent further states his belief that there is no doubt that the true flux for the New Zealand iron sand has been discovered. The mechanical difficulties in smelting are overcome, and he says New Zealand has before it the great future of being the producer to an unlimited extent of the most valuable iron the world has yet seen.

PROSPECTING FOR COAL.—John Dolbeer of San Francisco, who has become interested in Elsinore, San Diego county, has associated himself with J. D. Huff, and they have entered into a contract with the Denver Diamond Drill Co. to bore for coal upon a tract of land they have purchased there, and which they are satisfied contains an immense deposit of fuel. The drill is to be sent 2000 feet and more if necessary. Work is to commence as soon as machinery can be put on the ground. As this is the first diamond-drill test on the coast of Southern California, the result will be watched with interest.

THE Anaconda Company, Montana, has made arrangement with the Silver Bow Water Company to purchase all the water that can be spared, and this will be turned into the mine. It is thought that it will take two months to flood the burning mine.

Mining-Camp Blackmailers.

How They Have Kept Back Coeur d'Alene. The *Wardner News* has the following story to tell, which is one that fits other mining camps on this coast as well:

The honest miner is a personage the Western man for years has loved to honor; he exhibits the truest types of manhood and is held in the highest esteem by all who know what it is to battle with fortune and pluck the laurel wreath of success in an honorable and legitimate manner. Such men are worthy of all praise for the part they have taken in the development of our country. Through their enterprising new communities have sprung into existence, thriving and populous camps have been created, and the people realize how deeply they are indebted to them for their present prosperity and the fond hopes they entertain for future success. But in all communities black sheep are found, and Coeur d'Alene is no exception to the rule. Since its early settlement we have been afflicted by the presence of individuals calling themselves miners, who have had no other object in view but to live on the success of legitimate mining men, and when chance occurred assert their claims to the ownership of property on false pretenses for no other purpose but the levying of blackmail, and failing in that, to involve the property in litigation. Thunderbolts of invectives have been privately launched upon the heads of such aggressors, but for various reasons no one has been found willing to publicly lift his voice in reproof of their conduct. The barefaced persistence in their reprehensible course, and their apparent disregard for the principles of common justice, suggest inquiry, and the *News* knowing the condition of affairs would have resented it in its duty to its readers and the public if it did not cry aloud against the existing evil. To keep silent any longer would be to pursue a course inimical to the interests of our vast mining regions and would be only a manifestation of cowardice unworthy of the press.

Capitalists and men willing to invest are scared from their good intentions by the constant acts of such blackmailers. Such individuals are paralyzing the industry of Northern Idaho at present. Their acts create suspicion and cause unnecessary delay in the development of valuable mining property; they incommode the owner, destroy the confidence of the stranger, and in many cases involve litigation that is costly and injurious, while it never fails to result in disadvantage to all.

Yreka district can be cited as an example of the evil effects produced by the operations of those unscrupulous blackmailers, and the closing down of the famous Bunker Hill and Sullivan mines furnishes an undeniable illustration. Work was suspended on the property last April with a view to opening up the main or lowest tunnel in order to prepare the mine for more extensive operations in the extraction of ore, and also to determine the continuity of the ore developed in the upper workings, which up to the present period is uncertain. At the time of closing, the ore had diminished in grade but increased in body, and the owners concluded that the only system to insure a profit was to operate on a large scale with an economical plant, run by water and electric power, with tramways and all other modern and approved devices. At that time the company had completed all arrangements for the erection of a mammoth mill on the South Fork; a contract was made with the Cameron Brothers to furnish 1,000,000 feet of lumber, but all further progress ceased on account of an injunction on the Sullivan mine, granted without any hearing in the matter. This was obtained on the affidavit of a party who had been, and was at the time, an employee of the company.

About six months prior to the granting of the injunction, an entrance was surreptitiously gained to the mine through doors that were locked, and in that way a survey was made. This injunction prevented work in the Sullivan on the dip of its vein, and in consequence all further operation was stopped in the lower tunnel, paralyzing at the same time other development on the property. Quite recently an attempt was made to jump a piece of ground adjoining the Sullivan, the title of which has never been disputed. Two location notices were recorded in Murray prior to any notice being posted on the ground, any stakes being driven or any discovery made. The ground on which the discovery was claimed was, at the time, covered by a big snowslide. The intent of such a scheme is at once apparent, and with just as much reason, frash locations of the entire property might be made. The company has determined to expend no more money until absolute protection by law is insured, for if they have no right to the ground, what profit could accrue from further investment? Mr. Reed came here in good faith, paid a large figure for the mines and expended nearly \$1,000,000 in purchase and improvements, taking every precaution from the start to buy up all conflicting titles and paying cash therefor. In this connection it can also be stated that he bought two pieces of property for which he had to settle twice, second claimants appearing after the first settlements were made.

These incidents are prominent among many that can and will be cited in support of our assertions. Wardner has suffered sorely from the effects of blackmailers, who in the main are nothing but barroom bums waiting their opportunity to pounce on the property of good men, and to accomplish their ends are ready

and willing to swear to anything. Wardner to-day should be the most prosperous camp in the entire Northwest; it is surrounded by the richest mines on earth, and the present comparative stagnation in mining matters is alone attributable to the villainous attempts of unscrupulous persons to exact blackmail. If we are to be run over by such characters and the press refuses to ventilate their proceedings and the people and the law fail to support honest men, we might as well strike our tents and seek new scenes. But better things are in store for us; a day of retribution is at hand and the ruthless invader of others' rights will soon learn his course is run in Coeur d'Alene.

The Postal Telegraph.

Mr. Norvin Green, President of the Western Union Telegraph Company, has appeared before the House Committee on Postoffices and Post-roads, where the bill for establishing a postal telegraph in connection with our mail service is now under consideration. According to his statement, the postal telegraph monopoly of the United States owns one-third of all the telegraph lines of the world and handles one-third of its messages. Here is an admission that alone may well startle the whole country with alarm. Like Victor Hugo's graphic description of the devilfish, this one monstrous monopoly, from its office on Wall street, has its fangs and tentacles fastened upon the social life and industrial activity of more than sixty millions of people.

The dragon then proceeded to show its mouth and teeth, and as it is a specimen of ancient animal life, a sort of magathetism, that has long managed to maintain its existence in the struggle of life with nobler creatures, but is destined soon to pass away, it may be interesting to watch its squirmings and writhings.

We are told that people are not asking for the postal telegraph. It is not very likely that as slow a body as Congress would move in this matter if the people were quiet and content. Would Mr. Green be willing to submit this question to a vote of the people?

We are told that the Baltimore and Ohio Telegraph Co. went into the cheap postal business and got smashed, and if the Government attempts to furnish cheap rates it will be in danger of entangling itself in enormous financial burdens. The sinister amiability of the attempt to frighten reminds us of a little French fable, wherein a farmer convokes all the tenants of the barnyard, and with sweet solemnity says: "Dear animals, I have assembled you here to advise me what sort of sauce I shall cook you with." "But," exclaimed an insurrectionary chicken, "we don't want to be cooked and eaten at all." To which the urbane Chairman replied: "My child, you wonder from the point." So we call Mr. Green to order, as wandering from the real issue, when he states that the United States Government cannot manage the postal lines any more satisfactorily and economically than these companies; that the question of cost cuts no figure in the case. The fundamental idea upon which the postal system of the United States is based is not that of revenue, as is the case with most European Governments, but to disseminate intelligence, accommodate the people, encourage trade and commerce, strengthen the ties of friendship and intercourse and give stability and vitality to our social and political fabric. In most of the European countries the postal service is conducted so as to raise a revenue, and therefore it is necessary to look carefully into all the details of the service as a means of supporting the Government. But here the case is wholly different. There is no reason whatever why our postal system should be self-supporting. We do not look to it as a source of revenue to meet the current expenses of the Government. Taxes from other sources, on the luxuries of life and sundry articles of foreign production which come into competition with home products, are more than sufficient to meet the ordinary expenses of the Government, including the annual deficit of the Postoffice Department.

Then it may be added in this connection that while the postal service of this country is not run for revenue, it is a significant fact that the decrease of postal rates has ever been followed by an increase in the revenue of this department. Postmaster-General Vilas, in 1887, reported a gain of \$4,840,000 in this service over all preceding years, and predicted the time was near at hand when the service would be self-supporting. This prediction is now so near verification that there is actually a bill pending to reduce letter postage to one cent. Now in the light of these facts the additional expense of the postal telegraph to this department will create no alarm, but rather inspire confidence in the measure.

This is a progressive nation—none more so. With our progress it is right that our legislation should gradually tend to reduce the burdens of the people in all possible ways consistent with good government, and cheap postal service that touches life at every point every hour in the day should be ranked among the most indispensable necessities of our business and social welfare.

Let the people on this coast who believe in a Government postal telegraph system make the fact emphatically known to their delegation in Congress, and give them a solid backing in the matter of progressive legislation,

Municipal Problems.

The questions have gradually been taking shape in thoughtful minds, can our large cities be honestly and economically governed, and whether their moral and political condition is not growing worse with each passing year. New York, Chicago, Philadelphia and San Francisco have recently furnished us some conspicuous examples, and even smaller cities are falling into their wake. They are gradually reaching a state of demoralization in all parts of the Government, even to the management of school boards and sanitation, that is truly deplorable, if not alarming. It would seem that when a city arrives at a certain period of existence that it is given over as a prey and foraging ground to politicians. The substantial, the thrifty and industrious appear to be engrossed in business or indifferent to local Government as almost to entirely neglect their public duties. They pay their annual taxes with a growl, especially if they are a little higher than usual, but always with the apparent sense that the exaction is unavoidable and with no well-defined idea that they are to any extent responsible for the continuance of this state of things, or if they do rally for a general cleaning up, it is but a spasm of indignant feeling that soon spends its force.

In most large cities the tendency is to leave the management of municipal affairs to a class who live on public patronage or who are the besotted followers of local bosses and rings or so far under the dominion of partisan prejudice and traditional names that the smart politicians have everything pretty much their own way. Every municipality employs a large number of men to fill the various offices, and the parceling out of these places is treated as the property or patronage of the chief bosses. For each place or appointment there is one innumerable and b'fy more anxious to be. The result is the mastering of an utterly servile and unscrupulous army of followers who rule the clubs and other organizations. They control the primaries and do the howling and striking. They distribute the bribes and herd the voters. Above these, and in the back room of some fashionable saloon, may be found the big bosses who are the minions and janitors of the gas companies, water companies and other dragons that combine to fleece the people and loot the public treasury.

The Tweed exposure some years ago in New York showed what a vast and hungry vampire would fasten upon a local body and thrive upon the blood of the tax-payers. The trial of the Chicago bondholders is a later exposure. Then Cincinnati, St. Louis and Philadelphia had a struggle with the anacrona. San Francisco is a young city full of lusty life and energy, but has not been slow to learn the vicious political methods of the older cities of the East. It is a question we are called upon seriously to consider whether the people rule or the clubs and cliques. Are they allowed to assume any fair expression of their will and opinions in city affairs? Have they any voice in fixing water rates, gas rates, sanitation and the like, or are they the victims of King Booodle and his cronies?

This is a question that has almost passed out of the power of many American cities to remedy. The greedy cupidity of the ruling classes increases faster than the growth of material wealth or taxable basis, and consequently deficits increase. And thus it may be seen that the tendency of municipal governments is to depart further and further from frugal and strict, honest economy. Now where this will lead to is a matter of the gravest concern. If we had only one example of a city reforming and staying reformed, there might be some ground of hope. Exposures are almost daily made by a vigilant press, and indignation meetings are held, and all evaporates in talk and paper resolutions. City charters are amended, a new distribution of power takes place, and the old story of corruption and mismanagement goes on.

It is just now a question that is attracting considerable attention how far our municipal scandals may be abated by placing certain public interests, such, for instance, as the water supply and gas, under public control. The experiment is certainly worthy of trial in the interest of economy, and that there would be a large abatement of corruption must certainly follow. That the vast accumulation of wealth in the hands of private corporations has tended to poison and demoralize municipal politics, is almost an every-day fact. It is very easy and profitable to manipulate municipal councils and Boards of Supervisors. The forces of the dragon are, or may be, concentrated into a mighty battery at one point, while the people are scattered like sheep without a shepherd, and the mischief is often done and legalized before they are aware of their danger. With the municipal ownership of these plants, at least one incentive to bribery and tampering with the honor of public officials would be taken away. The scheme has worked well wherever it has been fairly tried, and if all the friends of just government, of economy and a better service of the people would unite and move in a solid phalanx, the measure would be accomplished.

The importations of ores from Sonora, Mexico, at Nogales, Arizona, during the month of February were 751,000 pounds, valued at \$87,375; lead ores, 147,484 pounds; copper, 11,980; gold bullion, \$24,792; silver bullion, \$17,390.

Mining of Asbestos.

Some interesting information regarding the mining of asbestos in Canada was recently given in an article in the *Popular Science Monthly* by Prof. J. T. Donald. Mining, he states, is carried on by cutting down the hills of asbestos-bearing serpentine, much as a farmer cuts down a stack of hay or straw, or by open quarrying on the level. The rock is blasted out, and the asbestos, separated from the containing rock, is "cobbed"—i. e., separated by hammering from adhering foreign matter. This cobbing is a comparatively easy matter in the case of the finer quality, as it usually separates readily from the gangue, but in the lower grades much difficulty is experienced in separating the fibrous matter from the non-fibrous. At best there is great waste. Much of the asbestos is in thin or narrow veins, and is wasted, as by the present mode of operating, it does not pay to separate this from the serpentine. A machine that will enable these narrow veins to be utilized is a desideratum.

When "cobbed" the asbestos is graded according to purity, color, and length of fiber, into three grades, and bagged for shipment. The finest quality or "firsts" finds ready sale at prices ranging from \$80 to \$110 per ton. "Seconds" fetch from \$50 to \$70 per ton, while "thirds" may be valued at \$13 to \$15 per ton. In good mines the yield of asbestos is from three to five per cent of the rock quarried, and the cost of mining may be put down at \$25 to \$30 per ton. Returns obtained by the Geological Survey of Canada show that for the year 1888 Canada's output was 4404 tons, valued at the mines at \$255,000, and this the output of nine different mines. Over three-fourths of the whole was shipped to the United States, small quantities going to Great Britain, Germany, France, Belgium and Italy, and being used in domestic manufacturing.

Wide Tires.

We have seen miles of road made useless of the winter by some man who would put a big load on a wagon and hitch a large number of animals to it and "go through." The law should subject all such persons to a fine in double the cost of the road. In some of the States, the wide-tire law is in operation with most beneficial results. It might work some hardship for a time, but it might be put in gradual operation for a time in summer. In winter, no man should be allowed to spoil a road. Heavy hauling should not be done when the ground is soft. Some men would recklessly tear up ten miles of road that cost \$1000 a mile for the sake of hauling a couple of cords of wood over it.—*Columbia Sun*.

Here we have concisely stated one of the prime reasons why our roads are chopped up and in many instances rendered totally unfit for use and we think it time for some attention to be paid to a subject of such moment, which concerns everybody. Wide tires would be a partial relief, but it would be better to prohibit the heavy vehicle from going over a road when it is probable it will tear it up.—*Vacaville Reporter*.

THEY DID NOT PAY.—The Nevada *Herald* tells us of the experiment that some genius is making on the cemented gravel of the mines of Little York Township with gas in order to decompose the cement to make it more readily yield the gold which it is thought to contain. The experiment spoken of is not likely to produce any satisfactory results, as the cemented gravel was well tested years ago by stamp-mills, and all the companies had to abandon their efforts. At one time there were 16 stamp-mills in Little York Township for the crushing of cemented gravel, which they successfully accomplished, but there was not sufficient gold in the gravel to compensate the expense. The only profitable gravel mining in that district was by the hydraulic process, and when that was stopped by the injunctions of the courts the mines had to stop, and since that time there has been little mining over there except the cleaning up of bedrock and ground sluicing in the ravines. Near You Bet there is one piece of ground, the Brown claim, that pays for drifting, and it is the only one in that vicinity that is being worked by that plan that now pays its way. The decomposing of the cement by gas is not going to restore mining in Little York to its former prosperous condition. These mines to be made productive must return to the hydraulic process.

A SULPHURIC ETHER MOTOR.—M. de Susini, a Corsican doctor, has, it is asserted, constructed a motive apparatus or propeller of 20-horse power, which is worked by sulphuric ether, a result which the doctor anticipates will realize a saving of 65 per cent of the combustible material at present employed for setting machinery in motion.

STAMP-COLLECTORS.—The magnitude of stamp-collectors' operations may be judged from a statement that a gentleman lives in Baden Baden who refused an offer of \$1,250,000 for his collection of postage-stamps.

HYDRAULIC POWER at a pressure of 750 pounds to the square inch is now being conveyed about beneath the streets of London as steam is conveyed in this country.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

ZEILE.—*Ledger*, March 8: The water has again increased in this mine, necessitating the hoisting of water for nearly 24 hours each day. This prevents hoisting rock from the main shaft, and consequently 20 stamps of the mill are hung up until the water diminishes. A large number of the employees are laid off temporarily.

AMADOR GOLD MINE.—There is very little change to report at this mine. Supt. Darling has arrived, but no resumption of underground work has resulted as yet. The miners have not been paid their wages. They held a meeting in Pioneer hall Tuesday, to determine what should be done. Three weeks have elapsed since they quit work, and the law provides that miners' liens must be filed within 30 days after the last day's labor upon the property against which the lien attaches, or the lien is void. The miners are determined not to lose any of their rights. The agent of the company was waited upon to ascertain when they might look for the money. We understand they were told that the money would be forthcoming next Monday. The men decided to wait until then before proceeding to secure themselves by filing liens. It is said that when the mine starts again there will not be so many men employed as heretofore, at least not until the mill is ready.

SUTTER CREEK.—*Cor. Ledger*, March 8: Since my last another important transfer of mining property has taken place in this locality. The Summit mine, adjoining the famous Eureka on the south, has passed under the control of Eastern capitalists. This is gratifying news indeed, as Mr. Steward, who had the property hooded, had so much other mining business on hand that he was not in a position to operate it. The property is regarded as one of great promise, and it is hoped that it will respond to the expenditure of a little capital by developing into one of the best paying mines on the belt. The promoters of the South Eureka are only waiting for a settlement of the weather to commence operations in earnest. The new rope for North Star has not arrived yet. In the meantime they are doing some prospecting at the 800-foot level, to satisfy themselves, if possible, of the advisability of going deeper. J. H. Tibbits is expected up from the city, where he has been to make the necessary arrangements to do considerable work on the Sutter mine this summer. The sulphurets works, after a shut down of several weeks for want of acids and other material, have resumed operations, and evidently for a long run.

El Dorado.

ESPERANZA.—*Georgetown Gazette*, March 6: During the winter the work of sinking on the Esperanza, near Garden Valley, under Superintendent George Weist, has been prosecuted with the utmost diligence. We hear that the large ledge is improving in quality with depth. In conversing with a practical miner of that district, in no way connected with the mine, he expresses the opinion that the Esperanza will prove to be the most valuable mine in the county. We are glad to hear that this mine is more than holding its own as work of development progresses, for the building of a 20 or 40-stamp mill will be insured this summer. Mr. Burlingham has stayed with this mine for many years, through many trying pullbacks, confident that he had a valuable mine. He has great confidence in the old St. Lawrence mine. Over eight years ago he told us that before ten years have gone he felt confident that 200 stamps would be pounding out bullion in the vicinity of Garden Valley.

GRIZZLY FLAT.—*Cor. Mountain Democrat*, March 8: The Codlin Brothers at the crossing of Steely Fork, are putting up a 5-stamp mill, and as soon as the weather will permit, expect to commence crushing. Francis Delaney is running on the Treat mine and they have just struck the formation, a large body of porphyry and quartz. The tunnel is now in 200 feet. J. Lyons & Co. have made a very good cleanup on the Morey, and are going ahead with vigor. The Mt. Pleasant, under the superintendence of Capt. Smith, is still working to strike pay rock.

Calaveras.

CENTRAL HILL MINES AND OTHERS.—*Calaveras Chronicle*, March 8: The Central Hill mines, located six miles below this place, are turning out very handsomely; and in the neighborhood of Spring Valley, ground has been discovered which promises to be remunerative. At Central Hill the showing is especially flattering. Our special reporter gives us the following account of mining operations: The Union Shaft Gravel mine has proved itself to be one of the finest mines in the State, employing 16 men in and around the mine and several wood-choppers. The mine is run by steam. A washing of the gravel is made every 8 or 10 days. The last washing of last month produced 72½ oz. equal to \$4500 per month. The exposures are about \$1500, which is a very good showing for a mine that has lain idle for 15 years for the want of a little capital. There are some of the knowing ones around that feel like kicking themselves for not taking hold of it when they had a good opportunity. Adjoining the Union Shaft mine on the south is the old Swenson mine, owned by James Duryea, a valuable property waiting for a buyer. On the west of the Union is the Monier mine, a property of 80 acres containing the same lead as the Union and one of the easiest mines to open and operate in this section. The next west of this is the Benson mine, a splendid property. They have a three-stamp mill that crushes about 30 tons in 24 hours, and the dirt will yield from \$6 to \$8 per ton. The mine is worked through a tunnel of about 400 feet with about 60 feet of an incline at the end. The water is taken out with a syphon. They have a fine body of pay dirt to sight and employ about 16 men in and around the mill and mine. No timbering is required in the mine. The expenses are about \$1000 a month, which leaves a fine large margin for pluck and energy. About half a mile north of the Benson mine is the old Mullen mine, owned by Dave Cassinelli, and is at present being opened by a tunnel. This claim is known to have some very rich ground in it that could not be taken out by the old working as they were running down the channel and could not handle the water. Just west and adjoining the Benson mine is a mining prop-

erty of 200 acres on the old blue lead, and it is the only claim that can be worked and drained through a tunnel in this section. There is a fine opportunity for a little capital to develop a valuable property on the Ross ranch, near the old Spring Valley mine. A company has started in and piped off the surface and laid bare a fine large body of gold-bearing cement that prospects rich. It is too hard for the pipe, but the company intend to prospect the same thoroughly, and if it should prove to be extensive, they will erect machinery to work it. The next in order is the Michigan mine situated on the old Schockton ranch. It is a very peculiar deposit of gravel on the tops of the hills south of the road. It is from one to 20 feet thick and prospects from top to bottom. Mr. S. K. Snodgrass has about completed a new machine that is expected to work a hundred tons per day. They expect to have it running by the last of this week.

THE BRUNNER MINE.—*Mountain Echo*, March 6: Among the valuable mines in this section that are idle for the want of capital to work them, none strikes us as more valuable than the Brunner mine near Albany Flat. Some two years ago this claim was bonded by a company from San Francisco. This company sunk a shaft over 100 feet, but the water came in so rapidly that they were compelled to discontinue work. From the surface down to a depth of nearly 90 feet, the vein is fully 50 feet in width, and it is a well-known fact that this immense body of ore, by the ordinary process of milling, will yield from \$3 to \$4 per ton, and yet this mine is not made to yield up its golden treasure.

Inyo.

CERRO GORDO.—*Inyo Independent*, March 7: At last report the Union shaft at Cerro Gordo was timbered down to a depth of 600 feet. It is said that no timbering will be done below that point at present, but that miners will be put to work prospecting for ore on the 600 foot level. Up to this time the present owners of the Cerro Gordo mines have not done any prospecting, and all ore taken out since they took possession of the mines was by tributers. The company has already spent a good deal of money getting the mines in repair, and may have to spend much more before any profit is left.

BORAX.—The borax teams are again on the road hauling from Conn & Trudo's works in Saline valley to Alvord. The first trip after the recent storms two or three wagons broke down on the way, but the roads are now in good condition and there will be no more interruption from that cause.

SYLVANIA.—*Register*, March 6: It is much to be hoped the Big Piner will succeed in the move elsewhere mentioned, to open up a practicable and much shorter wagon road across the Inyos to Sylvania district. The big silver-lead mines of Sylvania mines have gone into new hands, and are to be extensively worked. These mines are believed to be capable of producing more silver-lead bullion, consequently freighting and other business, than is now done by all the rest of our mines combined. The cost of transportation to the railroad has been almost the sole obstacle all these years to the development of that very promising district, and, in short, that whole section. That obstacle still remains. This proposed road, if found as good as hoped for, will remove it.

SALINE VALLEY.—*Register*, March 6: A vast number of borax locations have been made in Saline valley—in fact the entire valley where the least trace of borax can be found is under claim, and many locations double claimed, from which some litigation is likely to arise. Conn & Trudo, with only one hoiler, two or three white men and four or five Indians doing the gathering and hauling of the crude material, are said to be making about a ton and a half of merchantable borax each day, which rate, we take it, beats the record a long ways. The present market price of this borax is \$180 per ton.

DOING WELL.—The Inyo M. Co., Otto Duenn to charge, now have about 230 tons of good free-milling gold ore on the dump of one of their mines situated about half a mile north of the old Casey mine, and with six men take out about ten tons a week on an average. The mine looks as if this output may be kept up for months to come. The mill will be started up in two or three weeks.

Nevada.

PROGRESS AT THE MENLO.—*Tidings*, March 7: Supt. Rawlough of the Menlo property expects to have the pump in operation two weeks hence. The Shaft (Homeward Bound) is 270 feet in depth and is filled with water to within 60 feet of the surface, while further down it is known there is a big cave. Considerable timbering will have to be done. The Homeward Bound machinery will be employed, the pumping machinery being placed on a new foundation, for which the excavation has been made. Thy hob-pit has been cleaned out and repaired and other improvements accomplished.

EMPIRE.—The caving of the Empire drain tunnel Wednesday night resulted in forcing a large quantity of water into the shaft. Thursday night tunnel was cleared, but another cave followed. We understand, however, that this, too, has been disposed of. There are some 400 feet of water in the mine. The North Banner will start up Monday with a full crew. It was necessary to divert two-thirds of the water from the Cascade ditch Thursday night to save it from being washed away. A break is reported, but it will not interfere with the supply of water.

PEABODY.—*Grass Valley Union*, March 12: The work of pumping out the Peabody mine will be commenced next Monday, as the season of severe storms is now considered to be over, and water power to run the machinery is not likely to be again interrupted.

A FORTUNE AT STAKE.—*Grass Valley Tidings*, March 12: The suit of the Idaho company against the Maryland company has excited no little interest. It is now assumed by plaintiff that the true line of the lode is 400 feet north of the line heretofore established. This has for twenty years been regarded as a parallel claim, upon which the companies have parallel locations. Should it be proved that the croppings are not those of a parallel lode, but the true course of the Eureka-Idaho lode and the boundary line fixed in accordance, the Idaho company will gain and the Maryland company lose 200 feet of ground, and it is said that from the appearance of the Idaho lower levels this ground is worth a fortune.

San Diego.

TO DEVELOP COAL.—*San Diego Union*, March 6: From time to time Southern California papers

have contained more or less authentic accounts of the discovery of coal deposits, but in spite of apparently authoritative declarations that this or that deposit is to be systematically developed, nothing definite has been accomplished and nearly all operations heretofore have been intermittent and unsatisfactory. It is the primary purpose of the exploring expedition of Colonel D. K. Allen, now on the Colorado Desert, to prospect for coal. Yesterday an old miner named Urgueta told a *Union* reporter that he had been commissioned by some New Mexico parties to make a careful inspection of the deposit of coal that is said to lie at the southeastern extremity of the San Jacinto mountain range. The New Mexican parties are said to have been connected with the mines at Gallup, N. M., and to have been convinced of the value of the deposit near the San Jacinto mountains through a report that was conveyed to them of the region by a miner formerly employed by them. Mr. Howard, for a long time interested in large New Mexican and Arizona properties and later in San Diego, is said to be one of the parties who have in view the possible development of the San Jacinto deposit. The project, if carried out, contemplates the building of a short spur road southward from the Southern Pacific. The *Union* does not positively know whether the project will be carried out, but it knows that the parties are, or not many months ago were, amply able to put such a plan into successful operation.

Siskiyou.

SALMON RIVER.—*Cor. Yreka Journal*: The damage by high water has been considerable. Every flume taking water from the river in this vicinity has been diverted of 30 to 40 joints, and some lose more, but the sawmills will soon be in operation to furnish lumber to repair damages as soon as the snow disappears and danger of more flood is over. Very little work is now being performed in the mines, in consequence of unfavorable opportunity on account of deep snow, but the quartz miners will soon commence operations with good prospects, including the Black Bear.

GRAVEL AND QUARTZ.—*Yreka Journal*, March 7: The Portuguese companies, now engaged in cleaning out and repairing the Big Ditch, have completed the work from Forest House as far as Greenhorn, the cold weather of past three or four days retarding their progress, in consequence of freezing the ground to make tough digging. The weather being now warmer, they will rush the work along rapidly, and may be able to start the water through it in 10 days more, so as to commence mining on the Yreka Flats and at Hawkinsville. The Klamath river miners do not expect to put in their windmills this season as early as usual, as the great amount of snow to be melted yet will keep the river very high for a long time. The freshets, however, have cleaned out the river of an immense amount of tailings toward affording a better opportunity of getting down to the pay channels much easier than before. The hydraulic miners in different parts of the county are fixing up their ditches and mining apparatus for a long and prosperous season, in addition to which they will have an abundance of water in some localities to carry on ground sluicing in working off the surface ground above, the richest pay gravel lying closest to bedrock. The cold weather of last week caused the water supply to freeze up in the sluices and smallest streams, but these cool spells occasionally are no great detriment, as the snow and ice will thus remain longer to lengthen out the season for good working. When we have continued rains and warm weather, the snow fields go off too fast, and the water is wasted to a great extent. Myron Carrick and Archie Nichols, who have been working a placer mine at the head of Spring Gulch, on Yreka Flats, lately discovered a stringer of quartz containing gold visible to the naked eye, and are now following it into the Humbung mountain, believing it will show up a permanent ledge or very rich pocket. The Black Jack M. Co., now working the upper end of the Blue Lead, above Jilison & Co.'s claim, west of Henley, are making preparations to prosecute work on an extensive scale during the coming summer. They have sunk down about 75 feet and find very rich gravel, and on reaching bedrock, will run a tunnel from outside of hill for drainage and working of claim in a more systematic manner. They have a new steam engine at Sacramento, to be shipped as soon as trains haul freight, which can be of good service in working the pump and hoisting. When the claim is fully opened for work, they will put up a quartz mill to crush the blue claylike gravel, running the gravel from both sides of the batteries into sluices, as the water has no effect on the gravel to dissolve it.

MINERS BUSY.—*Yreka Journal*, March 12: We hear good reports from the dry diggings and mountain gulches, where the miners are all busy while water is plenty, in securing gold dust, this being the only good season for them during the past 9 or 10 years. As there is considerable snow on the mountains to last some time yet, they will be able to continue operations almost until midsummer, while those on the low flats will have water enough to supply sluices nearly all summer. Ground sluicing and hydraulic mining is now being carried on with the greatest energy in many localities, by having an abundance of water to work off the top dirt, leaving the rich bedrock strata to be run into the sluices when the water supply becomes lighter. By having a flood of water for the deadwork required, a great saving of expense is acquired in getting at the good paying ground, which is usually found nearest the bedrock. The miners on Little Humbung expect to do big work in mining during the coming spring and summer, having been unable to carry on mining for two years past on account of scarcity of water. The Klamath river miners will probably not be able to commence putting in windmills and machinery until late, owing the river being high, with prospects of continuing so until middle of June, in consequence of the great amount of snow still remaining in the mountain regions of its extensive watershed. The Warren quartz-mill on Yreka Flats will be started up again, as soon as the weather becomes settled and the roads fixed up for hauling. The road to Greenhorn is badly washed out, and needs rebuilding to permit hauling from the ledges in that section, and the roads leading to other ledges, also need considerable repairing. Myron Carrick and Archie Nichols have struck a rich quartz ledge in their placer claim at head of Spring Gulch, on Yreka Flats, a specimen of the quartz shown us by Carrick containing a great amount of gold visible to the naked eye. They have only just tapped

it and expect it will widen out to a first-class and permanent ledge. The Humbung range on west side of Yreka undoubtedly contains very rich quartz ledges, which are evidently feeders of the rich pioneer diggings on Yreka Flats that paid so big in the '50 period, and have been worked over to paying advantage since.

Trinity.

DAMS.—*Trinity Journal*, March 8: The high water in East Weaver creek during the past few days endangered the mining claim of Hupp & McMurry to such an extent that they have been putting in dams to prevent the water from breaking in and filling up the ditch and covering up things generally.

Tuloume.

ORE-ROASTER.—*Independent*, March 8: Mr. J. R. Moffit has been in San Francisco since the first of February getting out the machinery for his new invention, the Oxygeo Ore-Roaster, which is expected to revolutionize the process of working rebellious ores. He expects to return home by the middle of this month, when his machine will be completed. This is Mr. Moffit's own invention, and is all covered by patents. During the past year he has constructed a small one at the mine, which proved a success, and the new one now being finished, is of a larger size, but will be portable. A rock-breaker works in connection with it and acts as a feeder also. The principle is that of a complete roaster in granular form of all ores under a great air-pressure in a confined chamber burning oxygen. The machine is automatic in its operation, feeding and discharging continuously. Mr. Moffit will have his roaster in operation within two months, when the owners of refractory ores will be invited to send in their rock for trial, and at the same time inspect the operation of this compact and economical ore-roaster.

TIMELY ASSISTANCE.—*Union-Democrat*, March 8: Last Monday night James Gerlach and Thomas Jones came near losing their lives in the Boazana mine. They went down the shaft too quickly after a shot of giant powder, and Gerlach was overcome by the fumes. Jones had strength enough to call and attract the attention of Engineer Moody, who then discovered that the lights of the shaft were out. He at once descended the shaft and managed to get the men on the skip and to the surface. Gerlach was entirely unconscious and Jones not much better. It was a narrow escape from what would have been certain death but for Mr. Moody's exertions.

NEVADA.

Washoe District.

ALTA.—*Virginia Enterprise*, March 8: Crushing about 45 tons of ore daily, and ore reserves looking about the same as last report.

IMPERIAL.—West crosscut No. 1, from the 750 level of the Imperial, is out 245 feet, 27 feet being added during the week; face in low-grade quartz. West crosscut No. 2, from the north drift on the same level, is out 70 feet, 50 feet having been added during the week. The face shows quartz and porphyry. West crosscut No. 2, from the 500 level north drift, is being repaired.

CONFIDENCE-CHALLENGE.—The joint Confidence-Challenge west crosscut, from the 300 level north-drift, is out 206 feet, 17 feet having been added during the week; face in a mixture of quartz and porphyry.

YELLOW JACKET.—Shipping about 65 tons of ore daily to the Brunswick mill. Usual prospecting work reported.

BELCHER.—The 200 level west crosscut, opposite the shaft, has been extended a total length of 479 feet, and stopped in the footwall. Will commence drifting in the ledge as soon as the ground is secured.

SEG. BELCHER.—The east crosscut, 100 level, has been advanced 37 feet during the week; total length, 305 feet; face in porphyry with small stringers of quartz running through it.

CROWN POINT.—The north drift, 160 level, is out 66 feet. The face shows a streak of ore 10 inches wide of good grade. The various stopes are looking and yielding about as usual. Shipped to the mill during the week, 664 tons of ore; average battery value, \$6.63 per ton.

JUSTICE.—The 622 level north drift advanced 21 feet; total length, 705 feet. The stopes on the 490 level are looking well and yielding the usual amount of ore. Shipped to the mill during the week, 198 tons of ore; average battery assays, \$28.03.

CHOLLAR.—The raise 300 feet north of south line, 650 level, is up 58 feet, roof in quartz giving low assays. The east crosscut, 80 feet south of north line, 750 level, is out 25 feet; face in clay and porphyry. East crosscut, 185 feet south of north line, 750 level, is out 5 feet; face in hard porphyry. East crosscut, 80 feet south of north line, 850 level, is out 25 feet; face in porphyry. The north lateral drift, 930 level, is out 515 feet; face in clay and porphyry. Owio to the waterpipe break, no ore was shipped to the mill the past week.

POTOSI.—The east crosscut, 400 feet south of north line, 850 level, is out 20 feet; face in porphyry. The raise 400 feet south of the shaft, 930 level, is up 41 feet; roof in quartz assaying \$30 a ton.

SILVER HILL.—The 260 level northeast crosscut in the southwest drift, 430 feet from the shaft, advanced 20 feet through hard porphyry; distance from the shaft, 600 feet. On the 160 level are repairing the northwest and southwest drifts.

EXCHEQUER.—The east crosscut on the north line is out 128 feet; face in hard porphyry.

ALPHA.—West crosscut, 100 feet north of shaft, 500 level, is out 485 feet; face in porphyry. North lateral drift, 600 level, is out 155 feet; face in quartz and porphyry.

SAVAGE.—On the 300 level the south lateral drift was advanced 35 feet, making its total distance from the main west drift 65 feet. The north lateral drift is advanced 18 feet. On the 400 level they are stoping ore of fair grade north and south from the top of No. 1 raise. Are extracting ore from the 400, 500, 600 and intermediate levels. During the week milled 375 tons of ore; average battery assays, \$22 per ton. Bullion on hand and previously shipped amounts to \$27,445.

HALE & NORCROSS.—The usual work was interrupted on account of an accident to the water company's flume during the week, and only about half the usual force of men was employed. Have extracted ore from the 400, 500, 600 and 1200 levels and milled 569 tons; average battery assay, \$18.43

On the 1150 level a prospecting drift has been advanced 30 feet. From the north drift, 1250 level, a prospecting drift was advanced 25 feet.

SCURMON.—On the 130 level are making good progress cutting out a shaft station.

BEST AND BELCHER.—On the 1000 level, east crosscut No. 1 is extended 215 feet. Formation, hard porphyry. On the 1200 level the north drift has been cleaned out and repaired 40 feet; total distance, 375 feet.

GOULD AND CURRY.—On the 200 level from the southwest drift, at a point 335 feet from west crosscut No. 1, west crosscut No. 2 is advanced 52 feet. Formation, hard porphyry, with streaks of quartz. On the 400 level all work for the past week has been confined to repairs.

Pioche District.

RICH STRIKE.—Pioche *Record*, March 1: A rich strike was made last week in the Last Chance No. 1 mine owned by Henry Welland and John Anderson, situated in Highland district, and under lease now to Alma Green and two other men. The ore is very rich and assays from 500 oz. to 2000 oz. in silver. They have uncovered the ledge for about 10 feet and it is all ore and from 10 to 14 inches in width. There are some four or five tons of ore uncovered, and from the formation and indications they think the ore will continue with the ledge and depth. Two weeks more work will tell whether they have a veritable bonanza or not.

Tuscarora District.

NAVAJO.—No. 3 crosscut from south drift, 150 foot level, extended 22 feet. No. 2 crosscut from south drift, 350 foot level, extended 22 feet; face is getting harder.

BELLE ISLE.—The crosscut from 250 foot level extended 22 feet, face looking favorable. Crosscut from 350 foot level extended 11 feet, cutting a large vein giving low assays.

NEVADA QUEEN.—North gangway, from 600 foot level station, has been advanced 26 feet. Gangway is being run on footwall side of the ore, so as to make headway in getting to the line.

GRAND PRIZE.—400 foot level: North crosscut from west drift extended 8 feet. 500 foot level: East drift from north crosscut extended 11 feet, and showing a two foot vein of concentrating and milling ore.

NORTH BELLE ISLE.—South drift from station crosscut, 300 foot level, extended 7 feet. The stopes above the 300 foot level are without material change. North gangway from the shaft, 600 foot level, advanced 26 feet in the footwall rock and parallel to the ledge, thus making better progress and avoiding timbering. The ore where broken is found to be of high grade.

DEL MONTE.—1st level: North drift from No. 2, crosscut has been advanced 14 feet. The ore has raised up over the drift. North drift from joint crosscut has been extended 10 feet and continues to expose high grade ore.

NORTH COMMONWEALTH.—1st level: South drift from joint crosscut has been advanced 13 feet, developing 3 feet of rich ore, and improving as drift is advanced. Have started No. 2 north drift to open up ore cut by No. 1 crosscut, in seven feet, showing some good ore. North intermediate drift from No. 1 upraise extended 7 feet. North face of drift is all in ore, very high grade, assay from \$200 to \$800 per ton. South face is all ore but not so good average, but shows high grade mixed through the face. 2d level: Joint crosscut east extended 20 feet. A joint crosscut with Commonwealth will be started the 10th. This crosscut will open up the ground adjoining the Commonwealth on the south line of the claim.

COMMONWEALTH.—1st level: East drift from No. 1 north drift extended 16 feet, following the ore, which is developing well. North drift from No. 5 chute extended 17 feet, and is within 8 feet of North Commonwealth line. As soon as it reaches the line a joint crosscut will be started to open up all this north end. The 1st, 2d and 3d level stopes are yielding usual quantity of ore; 979 cars of ore hoisted and sent to the mill and concentrator. Average battery assay at mill, \$251 36 per ton; average assay at concentrator, \$18 32 per ton. Ship to-day \$18,000; total for week, \$35,021 91. Mill is running and doing good work.

Tybo District.

GOOD MINES.—Belmont *Courier*, March 6: There are other mines in Tybo district, Nye county, besides the 2-G and the Dimick which are known to be valuable properties, and which, in the course of time, will make a stir in mining circles. Judge George Turin, the Gilmore Brothers, L. B. Fairbank and others are owners of good mines, situated in that district. As soon as Congress remonetizes silver, these properties will be developed in a thorough and systematic manner, and they will undoubtedly yield immense quantities of rich ore. The people of Tybo will enjoy lively times again.

DAKOTA.

BEAR GULCH.—Spearfish *Reporter*, March 4: Few even of the well-informed persons of the Hills, on mining matters, are aware of the wealth of resources in a mining point of view, embraced in Rawlins mining district, more commonly spoken of as Bear Gulch district. One of the richest placer districts in the early days, it is one of the very few in the Black Hills where placer mining has been successfully carried on from 1876 to the present day. Practically all of three-fifths of the vast amount of work done on the hundreds of tin claims in the district has been paid for with the precious dust taken from its gulches in the most primitive manner, the supply of water rarely being sufficient for sluicing except with the aid of reservoirs of small capacity. Many, even among old-timers, are not aware that there are extensive ledges of gold ore scattered throughout the district, many of them free milling, and assaying from \$3 to \$7 per ton, or relatively richer than the ores worked to a good profit by the Homestake Co., but such is a fact, nevertheless. The Bear Gulch gold ledges, traceable for miles, are lying neglected for lack of milling facilities, awaiting the time when cheaper transportation and the advent of outside capital with large mills can render them paying properties. Refractory gold ores are also known to exist in vast quantities within the limits of the district, in a belt extending from Iron creek westward some five or six miles to Mallory gulch, on the Wyoming side, and so far as superficially prospected, running north from Beartown some four miles, and south six or seven miles to and beyond Cement hill. Sil-

ver ore in almost all its known varieties is known to exist in nearly all parts of the district, yet, strange to say, little prospecting has been done for it. The tin belt covers a known area of over 30 square miles, the rich ore in many places being exposed with great wide faces, where it can be quarried for years. The great abundance and rare richness of these tin deposits has overshadowed the presence of the more precious metals, and caused the neglect of prospecting for them, the miners deeming that tin property would meet with more ready sale, and that, with the money realized from their tin claims they could better develop the others, and keeping to themselves, as far as possible, their knowledge of the latter. Prof. Chase, now located at Redfield, South Dakota, while he was superintendent of the Cleveland Tin Co. in 1886 and 1887, took a great interest in the mineralogy of the country, unhesitatingly pronounced Bear Gulch the most wonderful mineral district he had ever been in, its metals covering a larger range and occurring in large bodies, giving it a wealth of mineral resources rarely met with in the same area.

ARIZONA.

THE BUFFALO MINE.—Globe *Silver Bell*, March 6: Dr. A. Trippel arrived on Wednesday evening, on business connected with the Buffalo copper mine. From him we learn that the intention of the owners of that property is to prospect the mine, and if developments justify it, enlarge operations and begin smelting. Work in the mine is to commence at once with a force of 10 or 12 men. Persons best qualified to express an opinion believe that the Buffalo is one of the very best copper properties in Globe district, or for that matter, in Arizona, and in time, under wise management, will become a steady producer. Dr. Trippel's attention, for the next few months at least, will be chiefly occupied in directing operations at the Arivaipa mines, four miles north of Dunlap, Graham county, recently purchased by Mr. Goddard of New York, and to be operated by the Arivaipa M. Co. The claims, 32 in number, are considered promising prospects. The ores are argentiferous and the deposits very large. A great deal of preliminary work must be done, such as constructing roads, erecting buildings and providing the necessary equipment of machinery, tools, etc., before mining is actually begun, which, however, will not be later than a month hence. Dr. Trippel, after personal observation and from information obtained from well-posted mining men encountered in his travels, expresses the opinion that Globe is the most promising copper camp in Arizona.

COLORADO.

ST. KEVIN.—Leadville *Herald-Democrat*, March 6: The new shaft of the St. Kevin mine at Leadville is now down about 230 feet, and it is estimated that a further sinking of about 90 feet will bring them into the chute caught on the drifting at the bottom of the winze from the 400-foot level of the old workings. This chute is already proven to be a good one, and the connection once made between these workings and the new shaft will greatly facilitate the handling of the ore, and also tend to develop a comparatively new territory. The mill on this property, while running with only 10 stamps dropping, is handling about 40 tons of "mill dirt" per day, and is doing such good work that the concentrates are running higher than ever before. The other 10 stamps are not run at present, as the water supply from the gulch is rather precarious, and as it might freeze on them, the management prefer to be able to count upon a given supply than to take any chances. Several small stringers of ore have been met with in this shaft in the sinking, but as the purpose has been to sink this shaft to the old mineral contact, very little attention has been paid to them. Later, they may be followed and prospected, but at present the prevalent idea is to get down to the main vein and make the connections by which the shipment of ore from that point may be facilitated.

ANOTHER POTOSI STRIKE.—Supt. Carroll of the Potosi mine arrived in Denver yesterday morning. He had specimens of rich ore and a pleasant smile. On last Thursday the men at work on the property came into an ore streak that indicates no little richness. An assay was made which resulted in the gratifying report of \$40 to \$60 per ton on different pieces taken without special care, he says. The average of the ore is \$490 per ton. This is the second strike in this property in a month, and seems to indicate that the deeper the men go the better ore they get.

IDAHO.

FROM SMOKEY.—Wood River *Times*, March 5: N. E. Heckethorn is in from Smokey. He says the King of the West has yielded more than expenses all winter, but no strike has been made in the mine recently, and any announcement of ore is premature. The miners are, however, working to get under an ore chute—a point which they expect to make in about two weeks—when they will probably cut into ore. The property has excellent prospects of becoming a mine. Before leaving, Mr. Heckethorn heard a report to the effect that the leasers on the Carrie Leonard group had over 200 tons of ore out, with more in sight. He does not know on what claim this ore is but believes it is the Pot Wrestler.

THE IDAHOAN.—Statesman, March 5: Mr. A. J. MacGowan of Hailey reports the famous Idahoan mine in a very promising condition, eight feet of good ore having been found on the 800-foot level, which is evidently continuous with a similar ore vein on the 600-foot level, thus bringing virtually in sight a strong vein of 200 feet perpendicular and of unknown extent along the length of the claim. These developments fully warrant the management in claiming an ore body in sight, the value of which at the lowest estimate cannot be less than \$200,000. The town of Hailey is already feeling the impulse of this and other recent developments and discoveries in the increased confidence of business men and miners.

LOWER CALIFORNIA.

ALAMO.—The reason Mr. Kerr's Wiswell quartz mill did not arrive on the Newbern last month was because the roads from here to Alamo were in such poor condition that it could not then have been tak-

en to the mines, and Mr. Kerr purposely delayed its arrival. The roads are now in good order and the mill will be ready for work in Alamo by April 1st. The engine is 16x24 inches, of 60-horse-power, and is capable of running four Wiswell mills with a Gates rock-crusher attached. Mr. Kerr states that another Wiswell mill is to arrive on next month's Newbern and both mills will be erected on the Jeff. Davis claim in Alamo, just below the Company's mill on the same side of the creek. One mill will be used exclusively to crush ore from Mr. Kerr's three mines, the Asbestos, Jeff. Davis and Americana, and the other will be open to custom work. A Hinkle positive self-feeder will be attached to the rock-crusher. Concentrators will be attached to the mill, and patrons will get the full benefit of their ore. Mr. Kerr says he will make the price of milling within the reach of mine-owners with \$10 ore. J. M. Gonzales came in from Alamo on the Douglas stage last Monday. He has glowing reports of his mine, the Aurora. Thirty-nine tons of ore yielded \$13.80 per ton, and it was not a picked lot either. Ex-Gov. Geo. Ryerson has bought all of O. P. Reed's interest in the Reed, Wisconsin, Dora Mettel, Arabella and Hattie mines. The consideration was \$5000 in gold. Mr. Neal has bought a one-tenth interest in the Arabella, formerly owned by Mr. Hughes, for \$300. The Aurora is said to be the only mine in the camp that has paid expenses from the start.

MONTANA.

AROUND BOULDER.—Boulder *Age*, March 5: Eight bars of Holter bullion came down from Elkhorn the past week for shipment East. Two hundred and eighty-five quartz locations were made in Jefferson county during the month of January last. Sinking has been resumed on the Hoosier Boy, formerly the Grizzly, in the Bigfoot district. A car of ore from the 11th mine, in the Willow Springs district, and a car of ore from the Elkhorn Queen mine, near Elkhorn, are being loaded at the Northern Pacific depot for shipment to Helena. Messrs. Ham and Burrows have leased the Dunstone mine, at Elkhorn, for one year and have already begun shipping ore. The Bigfoot mine, in the Bigfoot district, a dozen miles south of Boulder, was sold by the Sheriff this week for \$1650, the Holter Hardware Co. of Helena being the purchaser. The Crescent mine, in the Upper Basin country, has been sold to Eastern parties, and immediate development will ensue. The outlook for the development of the many rich mines in the Upper Basin is very bright, and the prospectors who have been holding on to their properties in that section for 12 or 15 years, making such developments as their limited means would allow, feel much encouraged. The sale of the Elkhorn Mining Co.'s property at Elkhorn was completed last week, Messrs. A. M. Holter, M. M. Holter, C. L. Vawter, John Shober, and Mrs. Janet Kinna being paid \$532,000 and probably some stock in the new company in addition.

STRIKE IN THE MAY FLOWER.—It was reported in Helena last week by Mr. Davis of the Little Blackfoot region, that a good strike had been made on the May Flower lode, situated about eight miles south of Elliston. The shaft is down 100 feet and a level 110 feet in length has been run along the vein, which is ten feet between walls. The ore encountered is from eight inches to three feet in width and assays from 100 to 700 ounces to the ton.

THE MAGNOLIA CON.—The prospect of the Magnolia is now down 152 feet, and as the company is in good shape it will push the shaft to a depth of 200 feet and then crosscut. The capital has been raised outside of Deer Lodge, and economy has been used in its expenditure.

THE CHAMPION MILL.—New Northwest, March 7: The Champion Consolidated silver mill has been completed. On Wednesday last, at the hour of 5 o'clock, everything was in readiness to start the machinery. About 60 of our citizens had assembled at the mill to see it started on its mission of usefulness. At the proper moment, Gussie, the nine-year old daughter of Mr. N. J. Bielenberg, the president, touched the little wheel which starts the mill, and then all the vast machinery was set in motion. The mill is situated about one mile southeast of Deer Lodge. In a few days it will begin work for the company and be run to its full capacity. The Champion mill has a crusher 9x15, Blake pattern, 40-inch dryer, 20 stamps of 850 pounds each, 60-inch white Howell roaster, 8 pans, 4 settlers, and 1 clean-up pan. The power of the mill is furnished by a Westinghouse compound engine, of nominally 125-horse power. This is an entirely new departure in furnishing power for quartz mills, as the public has always considered that no complete mill could properly have anything other than some make of Corliss engine. The wisdom of the departure can be very readily seen, however, when the fact is stated that among all the engines that are made to-day, the Westinghouse compound engine stands on its actual guaranteed tests second to none in point of economy.

WICKES MINES.—Mining Review, March 5: The advent of spring weather has infused more life into the mining industry about Wickes than has prevailed for the past six months, and active development work is now being prosecuted on many of the "claims" in that locality. A large number of men are at work on the Gregory and Banner mines; the Sirius mine is undergoing extensive development. The Lightning mine, adjoining the well-known Copper Bell on the west, is keeping a small force employed in opening up a crosscut to strike the lead at a depth of 250 feet below the shaft, and many other properties are being worked or put in shape for next season's campaign.

THE CHAMPION.—Phillipsburg *Mail*, March 8: The engine and other machinery for the Champion mill, so long delayed, arrived last Saturday, and is now being placed, says the *Northwest*. Holders of Champion shares are elated, as they have assurance from the contractors that the mill will be completed and ready to start up by March 15th. The capacity of the mill is 30 tons per day, and if the ore averages as well as it has so far, the gross output will be from \$1200 to \$1500 per day. As briefly mentioned in these columns last week, the west drift has recently opened out a splendid body of high-grade ore that promises to rival anything heretofore discovered in the mine. The Champion's future is no longer a matter of speculation—it is one of assured prosperity.

ANACONDA.—Review, March 6: The mines of the rich section west of Anaconda all tend to produce base ore. Even the Southern Cross will be a

more profitable mine if its ore can be smelted, as was shown by the recent tests made at Butte and East Helena. The Anaconda smelter was constructed with a view to using it as a custom plant, and to these works the base ore from the Silver Lake, Flint Creek and Black Pine districts will naturally come. Bearing these facts in mind, it is evident what a tremendous power the Anaconda Company can exert in controlling the copper market. All estimates on the copper markets are made provisional to the amount of the red metal produced by the Anaconda. Since the fire in the mine, the copper market has been decidedly buoyant, and according to the Eastern estimates will remain so as long as the mine is not operated. From this it will be seen that the Anaconda practically controls the price of copper. Now, with large silver and lead producing country tributary to us and connected with the works by rail, the smelter could, in event of a sluggish copper market, be operated for silver and lead, and change the tendency of the market. With a capacity of 100,000,000 pounds of copper per year, the Anaconda works possess a great advantage over other copper-producing works, which, as soon as the Great Northern has rendered accessible the ores referred to, will result in untold benefit to the company and to our city.

NEW MEXICO.

THE RUSH TO THE MOGOLONS.—Southwest *Sentinel*, March 4: The rush in the Mogollon country has fairly set in, and the stages running between Silver City and Cooney are taxed to their utmost capacity to accommodate the number of speculators, prospectors and home-seekers desiring to reach the new mining camps on the Mogollon range. Freighters, too, are doing a lively business transporting stores and household goods to the new field of mining operations. Town-sites are being laid out and several fine business houses erected, while four or five new saloons already mark the sites of the prospective cities. A newspaper plant is about to follow, to publish to the world the wonderful mineral, ranch and agricultural possibilities of the little California. The bulk of the immigration to the new field is, so far, composed of the surplus population of the different localities in this and adjoining counties; yet that a steady immigration from the East will set in when the diligent advance guard settle down to business and their newspaper begins to tell of their great accomplishments, is easy enough to believe. The rapid growth and development of the new El Dorado means great things for this city, its chief outlet and supply depot, and the *Sentinel* can only hope that the fondest anticipations of the colonists will be fully realized and that the different camps of the Cooney and Silver Creek district will prove all that is claimed for them. The ore deposits are continuous, expansive and easily wrought, and the waste piles will not out-throw the shipping dumps as is the case in some of the mining districts.

CAVE CREEK.—Kingston *Shaft*, Mar. 8: Mr. Root came to town last Sunday feeling elated over his strike of high-grade ore on some mining properties in which he is interested on Cave Creek. James Stuck, foreman of the Eureka mine at Hillsborough, showed his pleasant countenance on our streets this week. He reports the mining outlook prosperous in that vicinity. Charley Fogarty was in town from the Carpenter district this week for supplies. We understand that Charley has a good thing across the range. He now has a large body of galena and lead carbonate ore exposed on a continuous lead for 600 feet; and one shaft, 35 feet deep, shows ore from top to bottom, and improving as it goes down.

HERMOSA.—The Hermosa district never looked so encouraging as at present. Nearly all of the leasers are doing excellently. The new "strike" on the lease of James Reed, McCrellis and Harkney on the Pelican Company's ground, bids fair to eclipse the St. Charles-Crigger lease of three years ago; and more remarkable for its depth of 125 feet below the shale contact. Beebe & Burk are still sacking the precious metal on their lease.

UTAH.

EUREKA.—Eureka *Chief*, March 7: Henry Kohl and Tim Kelly have for a number of years been at work on the King William group, on the summit of Eureka hill, and were rewarded this week by striking a foot of ore which goes over 100 ozs. in silver. There is no doubt that the vein will become larger and that the King William will add another to the long list of rich producers for which Tintic is becoming famous. On the 1000-foot level of the Mammoth a large body of ore was struck last week which is worth \$29 a pound. In other districts such a strike would set the people wild, but rich finds are so frequent that they cause no excitement here. It is rumored that a very rich body of native silver has been struck in the Bullion-Beck.

REVIEW.—Salt Lake *Tribune*, March 7: The receipts of bullion in this city for the two completed months of the present year, according to current bullion reports, excluding all ore, were as follows:

January.....	\$243,892 67
February.....	95,947 60

Total.....\$339,840 27

THE ONTARIO FOR TWO MONTHS.

January, bullion (ozs).....	87,751.2
January, ore sales.....	\$42,445 09
February, bullion (ozs).....	77,869.94
February, ore sales.....	\$59,898 32

THE DALY FOR TWO MONTHS.

January, ore sales (no bullion).....	\$15,610 23
February, ore sales.....	45,715 45

The week has been one of storms, cold and thaw, but the movements of the metals have been fair. There has been talk during the week of organizing a metal exchange, but no definite action has been taken. The receipts in this city for the week were to the value of \$136,776.62 in total, of which \$70,182.83 was in bullion and \$66,593.79 was in ore. For the previous week the receipts were \$126,673.75 in total, of which \$83,834.41 was in bullion and \$42,839.34 was in ore. The product of the Ontario for the week was in ore sales, \$10,160.29. The Hanauer smelter produced during the week bullion valued at \$650. Ore receipts in this city for the week were valued at \$30,559.68 by Wells, Fargo & Co., \$24,670 by McCormick & Co., and \$10,364.11 by T. R. Jones & Co.

MECHANICAL PROGRESS.

How Invention Has Revolutionized the Condition of Workingmen.

The progress of the age is shown as much in the advanced ideas now prevalent among workingmen as in any of the other signs of the times. Until quite recently the great hugeness of the unskilled workingmen has always been the displacement of hand labor by machine labor, which they argue throws so many men out of employment. The fact is too often overlooked that work is thus made very much less arduous, and statistics show that in the course of time the number of workmen employed is increased rather than diminished, and there is really no loss of employment.

In view of the antagonism shown against the adoption of machines in many branches of industry even up to quite a recent date, it is interesting to note the action of the coal miners of the Central States at their recent meeting at Columbus, Ohio. A resolution was passed at this meeting indorsing the Shaw machine and recommending its adoption in all the mines of the country. The use of coal-mining machinery is certainly very beneficial to those who are obliged to work in cramped positions when mining by hand. The coal-miners are very sensible to admit this, and their action proves them to be among the most progressive of workingmen.

We append a general summary of the extent to which invention has revolutionized the conditions of workingmen:

In the manufacture of boots and shoes, the work of 500 operatives is now done by 100.

In making bread-boxes, three workers can do the work of 13 box-makers by old methods. In cutting out clothing and cloth caps with dies, one worker does the work of three by old methods.

In leather manufacture, modern methods have reduced the necessary number of workers from 5 to 50 per cent.

A carpet measuring and brushing machine with one operator will do the work of 15 men by the old methods.

In the manufacture of flour, modern improvements save 75 per cent of the manual labor that once was necessary.

In making tin cans, one man and a boy with modern appliances can do the work of 10 workers by the old process.

By the use of coal-mining machines, 160 miners can mine as much coal in a month as 500 miners by the old methods.

One boy, by machinery in turning wood-work and materials for musical instruments, performs the work of 25 men by the old methods.

The horse-power of steam used in the United States on railways, steamers, and in factories and mines, was in 1888 12,100,000, against 1,610,000 in 1850.

In the manufacture of brick, improved devices save one-tenth of the labor, and in the manufacture of fire-brick 40 per cent of the manual labor is displaced.

Characteristics of Emery-Wheels.

Mr. T. Dunkin Paret, president of the American Tanite Company, recently gave a lecture before the Franklin Institute on the subject of "Emery-Wheels," from which we condense as follows:

The lecturer referred to the scarcity of literature on this subject, and then gave from his own literature and his own knowledge a brief historical sketch of the industry. It was claimed by a British authority that the solid emery-wheel was invented in 1842 by an Englishman, but this same authority admits that the Americans lead in the industry. He claims for both British and American wheels superiority over those made on the continent of Europe. Emery-wheels were broadly classed under three heads: Those made by some process of vitrification; those which are practically artificial stones; and those whose base is of vegetable or animal origin. In the first two classes were inherent defects, such as brittleness, hidden cracks and flaws, unequal tension, tendency to glaze or clog up with metal, and (in some) the tendency to deteriorate on exposure to the air. Preference was given to the third class, which could be divided into two sub-classes—those which were mechanical mixtures and those which were chemical compounds or organic substances. As examples of the latter he named the vulcanized oils and gums, metamorphosed woody fiber and tanbark. For all kinds of solid wheels the makers made strong claims, but as yet these claims had not been sustained or refuted by careful scientific investigation. Such investigation was needed in order that the comparative value of the different makes could be demonstrated, and also their value as compared with other tools and machines.

The industry was young, and it could not be expected to have the full development which characterized older ones. It was only now that the most experienced wheel-makers were ready to put their industry on a scientific basis, and now the users had lost all faith as to there being any science in the business, while they still felt that solid wheels were a necessity.

There were many mistaken demands upon the solid wheel. It was intended to grind and not to polish, and was not meant to supersede

all other metal-working processes. The solid wheel had its place on elaborate machines as a substitute for the steel tool usually employed there. It could be used on special machines to do more perfect work than the steel tool and to work on harder substances. It could be used on general machines as a competitor of the file, grindstone and cold-chisel. The solid emery-wheel was the great metal remover.

A mechanical professor had characterized the grinding room as a cast-iron slaughter-house. To do full work, wheels should be put on heavy machines and based on substantial foundations. The work must be in continuous contact with the wheel. Being so, the wheel became a rotary file which ran a mile in a minute and whose cutting points never grew dull. Unfortunately these necessary conditions were often not complied with, and only a fraction of the possible work was done. The visible results of a working wheel were very misleading. The greatest delusion was to make durability the standard of perfection in a solid wheel. While it was possible to have a wheel wear out too rapidly for economy, yet very few American wheels were too soft, the bulk being too hard, and their durability being more than balanced by the decrease in metal removal. These facts were illustrated by statistical tables.

A brief sketch was given of the abrading minerals generally used in solid wheels. General and special machines were described, a few typical uses were explained, the safety of wheels was discussed, some new uses were alluded to, and suggestions made as to the probable future development of the industry.

Various exhibits were made. One of these demonstrated that in equal time the wheel had cut 126 times as much as the file. This was on cast steel. In certain other trials the wheel had removed 21 times as much cast iron as the file and 34 times as much as brass.

The power needed to drive solid wheels was said to be much less than is usually supposed. The lecturer claimed that this new industry opened a wide and interesting field, as yet little explored, where both students and expert could do good work. He alluded to the greater fascinations held out by the problems in transit, in bridge-building, in electrical work, in metallurgy, and feared there might be some neglect to watch and improve the every-day practices of the factory, mill and shop. He held up the solid emery-wheel business as one example of the possibility of elaborating a great economy out of a small industry.

Economy in Manufacturing Bolts and Nuts.

It is claimed by Americans, even, that the English are ahead of us in both economy and rapidity in the matter of turning out track bolts, ship and bridge rivets. Manchester is the headquarters of the business and the process employed is noteworthy for economy, completeness and rapidity of production. The rivets are made from the scrap-heap at one heat, and finished for the trade as follows: The scrap iron is piled about one-half the usual size, and puddled in the customary manner; the molten ball of metal is passed through the squeezers, then through a train of six sets of continuous rolls, each pair feeding into the next and reducing the diameter correspondingly, and in order to insure a certainty of uniformity in size, it finally runs through a set of sizing rolls and then automatically conducted into a rivet-forming machine where adjustable cutters shear off the metal into proper length, reduce it to its proper shape, form the head, and finally drop the perfect rivet into an endless bucket-carrying chain, by which the rivets are carried to the packing-room.

One train of rolls feeds four machines, which turn out 16 tons of rivets in three shifts of eight hours each.

Track and bolt nuts are forged by the same process at the rate of 40 each minute. All are made from the billet at one heat. It should be remarked, however, that railroad spikes are made at Pittsburg, Pa., by the same class of machinery (which has not been although it might be applied to rivets, etc.), as in England. We condense the above from a communication to the *Western Manufacturer*, by W. R. Wilbur, a bolt and nut manufacturer, who attended the Paris Exposition, and who appears to have thoroughly informed himself in regard to his particular line of iron work.

Mr. Wilbur, while recognizing the superior class of machinery employed by the English in the forging of this line of goods, says that our mechanics are far ahead of our cousins in finishing and fitting up the same, whatever that may imply in regard to a machine that turns out the goods fully finished. He holds that our people are also ahead in tapping and threading, and are without certain modern improvements in that direction.

In closing his communication, Mr. Wilbur says: In this line of mechanics I believe that we Americans may learn much from close and intelligent study of the methods of our European co-workers. In the main we excel in rapidity and cheapness of production. Our inventive mechanical genius has been directed toward these latter elements, with a lesser consideration for the matter of quality, while on the other side quality has seemed to be ever the primal consideration and rapidity and cheapness rather incidental. Great mutual good must result from every well-improved opportunity for comparison of methods.

SCIENTIFIC PROGRESS.

Extermination of American Game.

Railroads and the "man with the gun" are proving too much for game, large and small; the first making easily accessible what, not long ago, was remote, almost trackless, wilderness and mountain fastness, and the breech-loading gun, especially the magazine type, enabling the veriest tyro to find his mark. The last link in that great chain of rails that has been uncovering the haunts of booted game is the new transcontinental line, the St. Paul, Minneapolis & Manitoba railway, invading, as it does, the last stronghold of the Rocky mountain goat, mountain sheep, elk, and woodland caribou. The wild country about St. Mary's lake, the Kootenai lands, too, is now thrown open to the sportsman, cattle-raiser, miner, lumberman and granger. Happily in the Yellowstone Park are collected some herds of the noble game once roaming the broad continent in countless thousands. What remains is in sad need of protection from the pelting hunter and the wretched slayer.

In a recent paper, W. T. Hornaday of the Smithsonian Institution computes the amount of game now remaining and discusses the prospects of its survival. He says the wildest trail of the old days is now across a fortnight's journey from Broadway, and the hunter who was formerly contented with a mere blunderbuss of a gun must now have a repeating rifle, by which he enters up the game with his first shot, and pumps lead after it, shot after shot, in rapid succession till he brings the animal down or sends it away with a mortal wound.

Then the Western farmer generally kills everything he sees, whether he needs it or not. Mr. Hornaday was once offered for a dollar each, 34 little spotted fawn-skins from the young of the mule deer, not one of which came from a fawn over three weeks old.

Practically speaking, the American bison in his wild state was not long since extinct. Eighteen years ago there were millions of them. The elk will be the next to go, being easy to kill. Once they spread over the United States, but are now found only in two or three localities in the Rocky mountains.

The prong-horned antelope, that picturesque creature, is scarcely good for ten years more outside the Yellowstone Park. He lives in the prairies, open plains or park-like meadows, and can be outwitted by the veriest bungler with a good gun.

Moose, since they range up to the arctic regions, cannot be wiped out, but in the United States they will scarcely last as 20 years, there remaining not probably less than 150 head.

The black-tail, or mule deer, will go long before his congener, the Virginia white-tail. The latter does his own thinking, being keen-eyed and alert, and skulking in the thickest timber, will not, in all likelihood, ever be driven even from the Eastern States. The Rocky mountain goat is as good as gone with us; all his haunts are known, and he is being slaughtered at wholesale. The mountain sheep, or big horn, is sharing the same fate.

The ancient Hudson Bay Fur Company is winding up its affairs, there being no more furs to be had, and an old fur-buyer, recently returned from the Northwest, says the business of gathering furs is dead. The beaver has become scarce, trappers now seeking the once-deep-seated muskrat and even the little gray rabbit to make up for the lack of beaver, otter, mink, marten and sable. The Southern fur seal is gone; the California elephant seal is extinct; the walrus is rare; the great arctic sea-cow is gone, its congener, the manatee, a curiosity. Bears, particularly the grizzly, wolves and foxes, are fast going, and milliners' taxidermists are now slaughtering the singing birds in vast quantities.

The Wonders of Human Mechanism.

The movements of the nerves and muscles in playing a piece of music are wonderful. A writer in *Popular Science Monthly* says he once heard Miss Janotta play a presto by Mendelssohn. She played 5595 notes in four minutes and three seconds. Each one of these notes involved certain movements of a finger, at least two, and many of them involved an additional movement laterally as well as those up and down. They also involved repeated movements of the wrists, elbows and arms, altogether not less than one movement for each time. Therefore there were three distinct movements for each note. As there were 24 notes per second, and each of these notes involved three distinct musical movements, that amounted to 72 movements in each second. Moreover, each of these notes was determined by the will to a chosen place, with a certain force at a certain time and with a certain duration; therefore there were four distinct qualities in each of the 72 movements in each second. Such were the transmissions outward, and all those were conditional on consciousness of the position of each hand and each finger before it was moved, and by moving it of the sound and the force of each touch; therefore there were three conscious sensations to every note.

There were 72 transmissions per second, 144 to and fro, and those with constant change of quality; and then, added to that, all the time the memory was remembering each note in its

due time and place, and was exercised in the comparison of it with others that came before; so that it would be fair to say that there were not less than 200 transmissions of nerve force to and from the brain outward and inward every second, and during the whole of that time judgment was being exercised as to whether the music was being played better or worse than before, and the mind was conscious of some of the motions which the music was intended to inspire.

DISCOVERY OF THE FOSSIL HORSE.—Prof. O. C. Marsh of Yale is still on the sunny side of 50, and a vigorous, pushing man. Mr. Marsh is probably the best known on the other side of the water of all our geologists. He received great honors from foreign societies and governments, a few years ago, on account of his discovery of the ancestry of the horse, bringing up his evolution from the lower order of animals to his present perfect state. His discovery came about in this wise: During vacation one summer he took a number of Yale students on a working frolic to "the bad lands," in Nebraska, which are regarded as the best for obtaining all sorts of fossils of any territory in the world. During this trip the professor and his party discovered a dried-up swamp that had probably been a lake centuries ago. Workingmen were building a railroad through it and throwing up thousands upon thousands of strange bones. These the professor gathered up in large quantities, and before he had finished his examination of them he had traced the origin of the horse six states back. His discovery complete, he sent its results and full specimens of the bones to different scientific schools and was greatly honored therefor. Probably no discovery of recent times attracted so much attention.—*N. Y. Star*.

A FACT SHOWING A RESEMBLANCE BETWEEN THE EARTH AND MARS.—The curious suggestion made by Mr. S. E. Peal of Assam, India, in demonstrating that Greenland is covered by a huge ice-cap, may have unconsciously solved an interesting problem in astronomy. It has long been noticed that the polar caps of Mars are not diametrically opposite the southern one, not being centrally placed over the axis of rotation, and it now appears that a like anomaly may exist on the earth. In Antarctic waters are seen immense flat-topped bergs of ice 2000 feet high and several miles long, which are evidently fragments broken from a permanent cap directly over the south pole; while in the Arctic region thin field-ice preponderates and bears out the assumption that the north pole is covered by a deep sea, quite free from islands, in which the ice finds no anchorage and is floating and temporary. Nansen's recent expedition, therefore, may result in proving that the Greenland continent underlies one of the two polar ice-caps of the earth, and in giving a clew to the condition of Mars by showing a closer resemblance to our planet than had been hitherto observed.—*Brooklyn Standard*.

UNEXERCISED GENIUS.—Genius without exertion is practically nil. Emerson says: "Genius unexercised is no more genius than a bushel of acorns is a forest of oaks. There may be epics in men's brains, just as there are oaks in acorns, but the tree and hook must come out before we can measure them. We very naturally recall here that class of grumblers and wishers who spend their time in longing to be higher than they are, while they should be employed in advancing themselves. How many men would fain go to bed dunces and wake up Solomons! You reap what you have sown. Those who sow dunces seed, vice seed, laziness seed, usually get a crop. They that sow wind, reap a whirlwind. A man of mere 'capacity undeveloped' is only an organized day dream, with a skin on it. A flint and a genius that will not strike fire are no better than wet junkwood."

IS THE EARTH GROWING COOLER AND ITS CRUST THICKER?—The *Scientific American* says: There is nothing positive as evidence of the prehistoric condition of the earth and its crust. The geological succession of the strata forming the crust of the earth suggests the generally received theory of the gradual cooling of a former fluid globe. The volcanic and earthquake evolutions upon its surface now are suggestive of a thin crust resting upon a heated fluid center. Deep borings and mines also corroborate this view. Volcanoes have become active after many years of silence, and many volcanic cones and craters are known to have been silent during the historic period. Our large lakes have probably become somewhat shallower from geological changes as well as from drainage deposit of silt.

MOVEMENTS OF SALMON.—Very little is known of the movements of salmon after they leave their spawning-grounds; but it has recently been noticed that many salmon of the rivers of Finland contain copper hooks of peculiar form. It is now known that these hooks are used in the north of Germany, and that salmon of the Finnish rivers must descend in winter to the Baltic coasts of Germany.

TEMPERATURE OF THE MOON.—The most recent researches of Prof. S. P. Langley indicate that the mean temperature of the sunlit lunar soil is probably not greater than 32°.

GOOD HEALTH.

Keeping Healthy.

It is an old saying that an ounce of prevention is worth a pound of cure. Inspired by this idea, a kind friend, the other day, sent me a cleverly written little book on the art of keeping healthy. The author seems to think that in the absence of accidents nothing is easier than reaching the port of a good old age, "a consummation devoutly to be wished." He tells us what to eat, drink, and avoid; how to chew our food, when to go to bed, when to get up, what should be the proper temperature of our bath, how often we should wash our feet, how much exercise we should take, and when to take it, and what we should wear next to the skin in summer or winter. In short there is nothing from the brushing of the teeth in the morning to the blowing out of the light in the evening that may not be learned from this little manual of health.

There is no branch of literature in our day in which the activity is so great as that devoted to the art of keeping well. The press teems with such books and the monthlies and periodicals come laden with suggestions on the subject. The abundant supply of this sort of literature must indicate a corresponding demand, and no doubt many are greatly benefited thereby. But how far this benefit extends may be a question worth considering. It is certain that if any one expects that this attention to the art of prevention will become so general and intelligently understood as greatly to supersede the need of the family doctor, he indulges in a vain hope. This sort of literature is rarely perused by the class it is intended for. People in good health care little for it. Their physical mechanism runs so easily they hardly feel they have a body. It is only when good health is lost that it is appreciated, and then prevention is too late.

And then may not the promiscuous consultation of such elementary guides to health tend to create a morbid solicitude that may often end in confirmed hypochondria? It is very easy for some people to imagine they have the dyspepsia one day, a tapeworm the next, and finally conclude that it is hepatic liver or a severe attack of Bright's disease, when really nothing serious is the matter with them. More than half the success of mental healing or the faith cure comes of this kind of morbid imagination. Then the minute simplicity of the directions for preventing or curing disease may load many, puffed up with a little smattering of knowledge, to think they can dispense with the aid of a doctor, and by delay and tampering with remedies greatly imperil their chance of recovery. Have we not all known just such cases? Have we not known many who could have been cured or at least greatly benefited if they had sent for an experienced practitioner in time? We have not the least doubt that many cases of mortality are directly chargeable to the family doctor-book.

Then akin to this sort of literature is the very kind and amiable feeling that prompts so many to offer advice to the sick or complaining. With the best motives in the world they tell us how they or some friend in a similar condition found relief in a certain kind of diet, decoction or drug. They are sure it would benefit us if we gave it a fair trial. But such people forget that what is beneficial to one may prove hurtful to another; that there are no fixed rules in matters of health, and each one must largely be a law unto himself. One may find watermelons, cucumbers and pickles absolutely refreshing, while another finds them deadly poison. One finds a cup of tea late in the evening promotive of a good night's rest, while it would keep another wakeful and restless. One man may eat a big piece of mince pie with a glass of older and go to bed and sleep soundly, while another who tries it dreams that the devil came and sat cross-legged upon his stomach, holding the Benker Hill monument in his lap. There are some who find a light breakfast the best preparation for a good day's work and a sure cure for rheumatism; others find a hearty breakfast indispensable to any activity, mental or physical, and the only safeguard against dyspepsia. One cannot drink coffee; another finds it essential. Early rising clears one man's brain; it makes another stupid and incapable all day. One finds a daily cold bath the making of him; another tries it and declares it nearly killed him. One needs two hours' daily exercise for any effective brainwork; another finds the less he takes the better he thinks. So it is about blankets, woolen underclothes, and about every habit, article of diet or drug; that, in short, what is one man's food is another man's poison; that in all matters of health there is no absolute standard; that, owing to some inscrutable peculiarity of individual constitution, there are almost as many requirements as there are persons and tastes, and each one to a great extent must find out for himself what agrees with him.

THE GARTER NO SOURCE OF DISEASE.—Contrary to the general idea, the garter is not, as a rule, a source of disease. The *Medical Record* says: "Varicose veins occur oftener in men than in women, and proportionately oftener in athletes and men trained to severe exertion. There are many things, indeed, which, cause them, and artificial constriction of the limbs seems to be a very remote and rare factor. In England

we are told that the demand for "anti-varicose" stockings is chiefly made by full-fed men who lead sedentary lives and drink more wine than is good for them. A wearer of the anti-varicose stocking feels worse after a series of dinner parties, when the tempting varieties of the menu lead him to indulge too freely in the pleasures of the palate. Obviously, no very bad case can be made out against the garter, provided it is a good garter, combining the maximum of support with the minimum of constriction, blending harmoniously with the hose and the circulation. The garter has come to stay; and the doctor had better prescribe a proper kind than preach its abolition.

USEFUL INFORMATION.

Soap-Bubbles.

The making of soap-bubbles is an interesting employment of the philosopher as well as of the child. The former finds much in the way of scientific interest attached to the operation, while the latter is generally absorbed in the matter as a pure piece of amusement. How to make the largest kind is told as follows:

Next to white castile, the mottled castile gives the best results. The soap being obtained, a friendly druggist must carefully weigh out 60 grains (for exactness in proportions is needful) for each ounce of water—that is, one drachm (according to the apothecary's weight of the old arithmetic), and when the weighing is done and the obliging druggist thanked for his kindness, the rest is plain sailing. A bottle with a sound cork is the next requirement. It must be large enough to hold three or four times the quantity of solution you wish to make. Do not prepare too much at one time; two ounces of soap solution will be a good quantity, and for this a six or eight ounce bottle will be the right thing. The bottle must be well cleaned and then thoroughly rinsed out with soft water—which, by the way, should be used for all the operations.

All being ready, the soap is cut into fragments small enough to enter the bottle. Measure an ounce of water for each drachm of soap; this can be done with a teaspoon, eight spoonfuls making an ounce. Having poured the water and put the soap into the bottle, we have now to await perfect solution, which will happen in the course of two or three hours if the bottle be put in a moderately warm place. Then add glycerine to the soap solution, the quantity varying with our ambition. I have found that one-half the volume of the solution gives excellent results; that is to say, to each ounce of water add one-half ounce of glycerine, measuring the quantities instead of weighing them in both cases. The bottle is now to be tightly corked and well shaken; then set aside for two or three hours more, and well shaken again. These alternate periods of rest and agitation should continue for a whole day. Finally, concludes Thomas W. Chittenden in *St. Nicholas*, let the bottle stand undisturbed and tightly corked for 24 hours. Bubbles of great size and beauty may be blown with this solution.

The "Accident" of Discovery.

Usually important discoveries are the result of the expenditure of much skill and labor; but it is quite often the result of the merest "accident." Nearly every one is familiar with Goodyear's discovery of vulcanizing rubber, also the late discovery of saccharine; but the particular object of this paragraph was a reference to the accident which led to the discovery of gun-cotton, which, according to the *Western Druggist*, from which we copy, has never before found its way into print. That paper says:

In 1846, Boettger and Schoenbein had a laboratory in Frankfurt, Germany, where they also gave instruction in chemistry. They resided with their families in the building where the laboratory was located, and Mrs. Schoenbein, being a very economical lady, would "gather in" any odd material found lying about the laboratory. It so happened one morning that a lot of oakum, used in wiping off dishes similarly to the present use of sawdust, was found by the frugal wife, who directed a domestic to wash it and spin it at night as "recreation" after a hard day's work. This young person by some accident fell into the embrace of Morpheus, and Mrs. Schoenbein awakening late at night and finding the light burning, rushed into the room with a candle in her hand to see what was the matter. In bringing the flame a little too close to the oakum on the spinning-wheel, a terrific explosion took place, and persons appearing upon the scene found both mistress and servant in a fainting condition. Upon investigating the cause next morning, it occurred to Schoenbein that the oakum had been used to clean a large dish containing sulphuric acid and potassium nitrate used in illustrating an experiment. The acids had converted the impure cellulosic oakum into pyroxylin.

MODERN BATTLE-SHIPS.—It is said that nearly all the first class battle-ships of the British navy are practically in a disabled condition, and the Admiralty dare not send one of them to carry the flag of the Commander-in-Chief to the Mediterranean.

ELECTRICITY.

Electricity and Legislation.

Gov. Campbell of Ohio, in his recent inaugural address to the Legislature of that State, says: "The duty of investigating the generation and distributing electric currents is one which presses upon you. The investigation should be prompt and thorough, and such action taken as may, in your judgment, throttle this evil in its infancy." The evil referred to is, of course, the dangers which arise from defective wires.

The Governor seems inclined to put upon the Legislature a somewhat difficult task for such a body. The average State legislator would find it rather a difficult task to "investigate the generation and distribution of electric currents." The Governor further says, unless something is done in this direction, "the companies which put up and control them [the wires] will have grown so rich and powerful that the passage and enforcement of proper laws will be difficult." The Governor seems to have written himself down as directly antagonizing one of the grandest steps in the progress of the age—one of the largest means yet discovered for providing the comforts and conveniences for man, and for developing the commerce and industry of the world. He moreover seems to think that the opportunity for profitable investment must necessarily lead to corruption.

Of course something in the way of legislation in regard to putting up and employing electric wires carrying heavy currents of electricity may be reasonably undertaken by even the average State legislator, but when such persons undertake to fathom and explain the principles involved in their operation, the work will very likely be fully as disastrous and futile as a rear and manual investigation into the business end of a mule.

There is no doubt much carelessness in putting up electric wires, and oftentimes a woeful neglect in making use of well-known safety appliances. Such things may properly form a basis for legislative action; but all investigations of the character referred to by Gov. Campbell can be successfully undertaken only by the most experienced and best educated electrical engineers.

REFINING SILVER BY ELECTRICITY.—A foreign exchange says the method of refining silver electrically, the details of which have been worked out by Mr. Moebius, is now coming into a somewhat extensive use. It is most suitable for the refining of aniferous silver containing about 11 per cent of gold, the cost in this case being only about 7d. per pound. The principle upon which the method is based consists in using, in an ordinary electrolytic bath, anodes of an argentiferous matte and a thin plate of pure silver as the cathode. The bath consists of a very weak solution of nitric acid containing about one per cent of the acid. The anodes, which are about 1/2-inch thick, with a surface of about 13 1/2 square inches, are placed in muslin bags, which retain the gold, platinum, peroxide of lead, and similar foreign minerals contained in the matte. The current used is 150 amperes, and the potential difference between the plates one volt. During the whole period of work, brushes are kept moving up and down the silver plates, which sweep off the silver deposited into troughs put for the purpose at the bottom of the bath. These troughs are removed from time to time, and the silver taken out and sent to the furnace. If the matte contains copper, this is dissolved by the nitric acid, but is not deposited on the cathode. The electrolytic method of treating mattes containing the precious metals will doubtless come into very general use when its value is better understood.

ELECTRIC POWER IN AGRICULTURE.—A consular note from Mons, Belgium, gives an interesting description of the part played by electrical power on a neighboring farm. A small ten-horse power dynamo was used to work a Ransome threshing machine, the rotatory shaft of the dynamo transmitting its high rate of speed to the shaft of the thrasher by means of an ordinary machine belt. The current driving the dynamo was conducted by an insulated copper wire from the initial source, a 16 horse power dynamo driven by a horizontal steam engine situated in the Chassart works, about half a mile distant. The loss occasioned by several transformations of power and the resistance offered by the wire amounted to only 40 per cent. The use of electricity for such work avoids all danger from fire when the wires are properly insulated.

ELECTRICAL FINGERS.—The scientists connected with the Johns Hopkins University, at Baltimore, are engaged in investigating the peculiar powers possessed by the fingers of Louis Hamburger. When the hands of the young man are thoroughly dried and touched to any polished object, they hold it like a magnet. He can thus raise a quantity of pine which will dangle from them, his index fingers possessing the quality more than any other. He also raises a glass tube weighted with a six-pound weight.—*Ex.*

DUCKS AND ELECTRIC LIGHTS.—Most kinds of night-flying birds and insects appear to have a great curiosity in regard to electric lights.

But a gentleman in Middleborough, Mass., has some tame ducks which seem to be perfectly crazy after such lights. When the lights shine, they go out into the street beneath it in a big flock and there promenade, flap and waddle in a high state of ecstasy. On rainy nights, when there is a puddle big enough in which to wet their feet, they are especially jubilant. When tired with their capers, they squat in the grass and blink at the brilliant light.

ELECTRIC LIGHTS IN FRANCE.—The first practical and permanent electric lights in France were introduced into some workshops in 1874. In 1878 they were first introduced into the streets, and in 1880 into private dwellings. The latest statistics show that nearly 1,000,000 horse-power is now converted into electric lights in that country, corresponding to a total intensity of about 200,000,000 normal candles; that the number of central stations exceeds 1500, and that of private installations 10,000, and that the capital sunk in electric lighting amounts to more than 1,000,000 francs. The United States has more electric lights in operation than all the rest of the world.

THE ELECTRIC LIGHT is being more and more used among the manufacturers of the wood-working class. It is practically the only light in use at the present time in sawmills, sash and door factories, furniture factories and all the wood-working establishments where a superabundance of inflammable material and more or less dust is unavoidable. Manufacturers recognize that they cannot afford to risk the lighting of their plants with lamps or even gas, with the danger from fire which these illuminators offer, and as a rule where motive-power is abundant and cheap, electricity, besides offering the best and safest light, is in the long run the cheapest.

ENGINEERING NOTES.

ANCIENT BRIDGES IN CHINA.—The Chinese suspension bridges, dating from the Han dynasty (202 B. C. to 220 A. D.), furnish striking evidence of the early acquaintance of the Chinese with engineering science. According to historical and geographical writers of China, it was Shang Liang, the commander of the army under Kaen Tau, who undertook the construction of the roads in the province of Shense, to the west of the capital, the high mountains and deep gorges of which made communication difficult, and which could be reached only by circuitous routes. At the head of an army of 10,000 workmen, Shang Liang cut through mountains and filled up the valleys with the soil obtained from the excavations. Where, however, this was not sufficient to raise a road high enough, he built bridges resting upon abutments or projections. At other places, where the mountains were separated by deep gorges, he carried out a plan of throwing suspension bridges stretching from one slope to the other. These bridges, appropriately called by the Chinese writers "flying" bridges, are sometimes so high as to inspire those who cross them with fear. At the present day there is still a bridge in existence in Shense 400 feet long, which stretches across a gorge of immense depth. Most of the bridges are only wide enough to allow of the passage of two mounted men, railings on both sides serving for the protection of travelers. It is not improbable that the missionaries who first reported on Chinese bridges two centuries ago, gave the initiative to the construction of suspension bridges in the West.

AN INTERESTING EXPERIMENT in jumping a torpedo boat over a boom was made recently at Porchester Creek by the officers of the British war-ship *Vernon*. The boom, 20 feet in length, differed from the usual spars which are used for the defense of harbors against torpedo attacks, in that it was six feet broad and was fitted with spikes, which it was supposed would hold the boat a prisoner. No. 49, a first-class torpedo boat, which had been strengthened for the purpose, was selected to attack the boom. She made a dash at the boom at a rate variously estimated from 16 to 20 knots. As she struck the spar, her stem was lifted out of the water almost as high as the boom itself, which sank on impact, and before it could rise to the surface the momentum of the craft had carried her over. She was subsequently berthed in the dry dock, and it was found that neither her cutwater nor her propeller had suffered in the least, nor had a single plate been bulged or started.

THE LONGEST BRIDGE.—What will probably be the longest bridge in the world is about to be constructed by the Roumanian Government across the Danube between Dudesti and Tchernavoda, thus effecting a junction between Huestenoga harbor and the Western railway of Roumania, which already runs as far as Dudesti. As there is a large tract of marshy ground on the left bank of the Danube where the bridge will be built, this will have to be no less than 20 miles in length.

THE HIGHEST LOCOMOTIVE SPEED.—London *Engineer* says there is no properly recorded instance of a locomotive ever having attained a greater speed than 80 miles an hour, and quotes Charles R. Martin as saying that higher speed is mythical.



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[NEW THIS ISSUE.]

Iron Moulders Wanted—Ridson Iron Works.
Paul Dry Amalgamating Barrel Process—George Bower.
See Advertising Columns.

Passing Events.

The pleasant, sunny weather of the past few days is rendered doubly pleasant by the very dreary winter through which we have passed. There have been storms in the mountains and the roads have been again blockaded, but from present appearances we have seen the worst of a very bad winter.

The burning of the Reno reduction works is a sad loss to the miners of Nevada, but the works will doubtless be rebuilt.

The owners of "dry diggings" in the northern part of this State are doing better than for ten years past, and making money while the water is running. The miners, when floods and slides cease, will be able to work off lots of top dirt with the surface water. The river miners will be late with their windmills, for the waters will be high. Ground sluicing and hydraulic mining in Trinity and Siskiyou are being carried on with great energy and a long and prosperous season is ensured.

The foundry strike still continues, and both sides of the contest seem confident. Of course there is great inconvenience and loss to the owners of foundries, who maintain that if they are to run their works at all it must be on different conditions than those which have been existing.

Artesian Wells for Cities.

The city of Oakland is having trouble about the character and price of the water supplied to the citizens. The people have become indignant at the neglect of the water company to remedy the existing state of affairs, and the City Council does not seem disposed to give any aid. Mass meetings have been held which have been largely attended by the respectable tax-paying element of the community. A Citizens' Committee of 100 has been appointed, and the gentlemen composing it are now engaged in discussing the matter of water supply and the best means of furnishing pure water.

A prominent idea which has been suggested is that the people of certain districts join hands in boring artesian wells for the common good, each well to supply a certain section of the city. When this project was discussed it was a matter of surprise to find that a very large number of wells had already been bored in various parts of the city and that families were being supplied from them. Not that it was not known that there was artesian water to be had, but no one supposed there were so many wells. Moreover, arrangements are being made to bore others. As a result there is a great interest in this subject in a city where there are 65,000 people.

In some parts of Oakland good artesian water is procured at a depth of 85 to 95 feet and rises to within a few feet of the surface. This water is clear, pure and cold. To be used in dwellings and on gardens it must be elevated by windmill or engine into suitable tanks. It is not therefore practicable for individuals to own the wells unless they have large pieces of land which have to be irrigated—that is, large lots from a city point of view. But the residents of a block, by united action, can very easily have a well and engine which will furnish them all with a good water supply for domestic use. The ordinary city water answers for fire and street-sprinkling purposes.

In former times the city of San Francisco had many artesian wells, and some of them are in use to-day, but the Spring Valley Water Co. has settling reservoirs for its supply, which is not the case with the company which supplies water to Oakland. Therefore, artesian wells are more necessary to Oakland than to San Francisco.

The topography of the country about the bay of San Francisco is favorable for artesian wells, and there have been many more successes than failures in boring for water. Oakland has back of it a range of hills with numerous canyons and water can be obtained nearly everywhere.

We have from time to time in the MINING AND SCIENTIFIC PRESS given considerable attention to this subject of artesian wells in California. There is really very little difficulty in obtaining a supply for domestic use from such sources. Where one well has been bored successfully others can be also. It depends on the locality as to the depth, of course. We shall be glad to obtain more detailed information concerning the wells in Alameda county, or, in fact, any that bears on the artesian belt of the bay shore. The following Committee appointed by the Citizens' Committee of 100, to collect information on artesian wells and promoting the same in Oakland, will also be pleased to receive facts and suggestions relevant to the objects sought: Ross E. Browne, S. P. Channell, Wm. Collins, J. K. Piersol, J. L. Lyon, J. C. Kimble and A. T. Dewey.

The late mass meeting of 5000 or more Oaklanders, protesting against perpetuating the exorbitantly high rates prevailing in their city for an exceedingly inferior quality of water, has aroused a determination to seek some permanently better source of accommodation.

In the next number of the PRESS we shall have more to say on this subject.

MONTANA papers assert that Marcus Daly is about to resign the management of the Anaconda mine, and that Robert Dillon is to succeed him. Mr. Dillon is a miner with long experience and for some years has managed the affairs of Haggin & Hearst, in Mono county, California, and is at present in charge of their mining operations in New Mexico.

It is rumored that the Germania Smelting Company, Utah, will shortly start up its refining plant and do its own refining.

Assessable and Non-Assessable Mines.

The people who have been organizing mining companies under the laws of the State of New York are finding out that non-assessable stock is not such a blessing as they supposed. There the shares of all mining companies must be un-assessable. The result is that the mines cannot be properly worked, and many New York companies have undeveloped mines on hand. In many camps in the Pacific States and Territories are mines operated from New York, which are in a bad fix. The credit of the companies is low and people to lend them money are scarce.

Now the mining brokers and holders of shares favor an assessment law, or they want the companies organized under the laws of California, where the stock is assessable, and the mines can be worked. It is no argument against this system that there are instances of its abuse; since, were it not for the California law, many mines now developed and worked, would be idle.

The California laws are founded on common sense and experience. Each man is liable for the amount of stock he owns as to assessment. If he owns 100 shares, a 50 cent assessment means he shall pay \$50 or else his stock will become delinquent and advertised for sale. He must bear his share of the burdens as well as the profits. It is said that the capital invested in New York in the mining industry is between \$50,000,000 and \$75,000,000. Many of the companies are listed on the Exchange Board, but few are paying dividends, and many are not being worked because of lack power to levy assessments for the necessary money. So New York is forced to acknowledge that California knows best about one thing at least; that is, how to operate mining companies.

Silver Discount and Mines.

The Alice Mining Co. of Montana crushed 30,059 tons of ore last year, worth \$23.58 per ton. The average value of the silver was \$22.47 per ton and of the gold \$1.11. During the year the company shipped 797 tons of bullion, containing 1,097,606 60 ounces, the value of silver in the same being \$725,296.03, and the value of the gold \$33,388.66.

For the greater part of the year the 60-stamp mill has been running, but the 20-stamp mill laid idle for the reason that the discount on silver was so great. The selling price of silver having advanced to about 95 cents per fine ounce during November, and to 96 cents during December, it was deemed advisable to put the 20-stamp mill in running order.

The entire silver and gold product for the year was \$753,684.69, which is reckoned at the old standard value of \$1.29.29 per fine ounce for silver and \$20.67 per fine ounce for the gold. The discount on silver was \$212,153.18, or a net yield in gold dollars of \$546,531.51. This discount is the greatest for any year since the company was organized. The figures will show how the silver mines suffer from the discount. There was a dead loss of \$212,153 in one mine alone. Notwithstanding the company had to work against this great depreciation and the low grade of the ores, one dividend of \$25,000 was paid and the remainder of the indebtedness, owing for the purchase of the Magna Charts, Valdemere and other mines, amounting to \$45,000, has also been paid.

PENNSYLVANIA MINERS.—There is much suffering among the miners in the Lackawanna region. Many families are on the verge of starvation owing to the scarcity of work in the collieries. They are being relieved by the Citizens' Relief Committee, which has opened a store of supplies and established canvassers to learn the condition of destitute applicants. No such misery was ever known among the anthracite miners as now exists, their time checks invariably showing them to be in debt to the operators for rent and other supplies. The miners are not working enough to give them a living.

THE cast-iron drum of one of the mangles in the Contra Costa laundry, Oakland, exploded last Monday, killing one girl and severely injuring another. The machine was being used for the first time. It was made in Oakland, and a coroner's jury has brought in a verdict that a girl was killed by "the explosion of an imperfectly constructed steam heater of a mangle machine."

The Foundry Strike.

There is not much change in the situation among the foundrymen and the striking molders. The men are still out and claim that the foundries will have to employ them in the end. On the other hand the manufacturers say they will send East for their castings if necessary, rather than take the men back on the old conditions. The Engineers and Foundrymen's Association has issued the following circular:

To the Foremen, Apprentices, and Employees of the foundries controlled by the Iron-founders' Association: WHEREAS, It has come to our knowledge that threats have been made against those now at work to the effect that if they refuse to take sides with the Molders' Union in the struggle now in progress, they will be denied the right to work in this city after the difficulty is settled, and have in other ways been intimidated.

In view of the above, the Engineers and Iron-founders' Association, individually and collectively, do here

Resolve and Pledge themselves: That the men and boys now at work, and those who may hereafter come to work, shall be protected at all hazards and at any cost.

Furthermore, that no settlement of the strike shall be made which does not fully protect all who have been faithful to our common interests.

We furthermore pledge ourselves to retain in our employ, while our establishments are in existence, those who stand with us at this time.

We are prepared to enter into contracts with molders for a term of service extending over one or two years, if desired, at wages varying from \$3 to \$4 per day of ten hours, according to the ability of the workman.

The Engineers' and Iron-founders' Association, by Ira P. Rankin, President.

The Mission Iron Works, owned by Wm. Axford, have closed down and the 20 molders and apprentices thrown out of work. The Judson Iron Works across the bay have also closed down, having had trouble about the apprentice system.

The men here talk of starting a co-operative foundry, but as they have no capital for such an enterprise, it is not probable anything will be done. If it were started, however, the foundrymen would not be displaced but would be glad to get their castings from such a source and let the men fight out their own labor difficulties. Some of the striking molders have left the city and others are reported as having returned to work. There is also a report that 75 non-union molders are on their way from Philadelphia to this city.

The foundry proprietors all say there would have been no strike if the molders had not limited the amount of work to be done in a day. We are now in direct competition with the East. Higher wages are paid here and higher prices for iron and fuel. To fight competition and also to maintain a contest with their workmen is more than the foundrymen care to do. Placing the minimum rate of wages at \$3 50 per day, allowing only one apprentice to every eight journeymen, thus depriving employers of a class of labor suitable for the cheaper grades of work, forbidding working by the piece, asking for a reduction of working hours, and finally restricting each molder's output, form a condition of affairs that the foundrymen could no longer tolerate.

THE TECHNICAL SOCIETY.—At the last meeting of the Technical Society of the Pacific Coast those present interested themselves in the examination of two improved transits, a level, a new article of tracing paper, a surveyor's rod, rules, etc., brought here from New York. The secretary, Otto von Geldern read a paper entitled "Notes on the Dry Dock and Cofferdam at the Mare Island Navy Yard." This paper was filled with statistical detail, some of it requiring illustration on the blackboard and by means of tracing paper. He commenced with the inception of the building of the docks and dam in 1873; gave a description of every portion of the work and its cost in detail; showed what subsequent alterations in the original design had been made; compared the cost of construction with that of similar works in other countries, and added that, although \$2,738,745 had been spent on the work, it was still unfinished.

THE Sowden brothers, two miners who were working a claim near Weaverville, Trinity Co., were killed by a landslide, last week. The two reservoirs above the claim were literally obliterated, and the sliding earth had carried off the pipe, giants, etc. The bodies of the two men were found in the bed of the creek.

Transverse Back-Stoping with Filling.

In the Chapin iron mine, Lake Superior, the deposit is very wide, and the surrounding rock is soft, so they had to give up what they called the "modified Nevada system" of mining and adopted the standard "filling system" employed in European mines, where timber is scarce. The cut given herewith shows the method of transverse back-stoping with filling.

Where the ore is wider than 20 feet, the filling must be kept close to the back. The miners then proceed in the following manner: On the first stope, different parties commence to work 50 feet from each other in the ore drift run parallel with the main level, and make cuts about eight feet high and nine feet wide clear across the ore. If the ground is weak, props or sets of light timber are put up as the cuts advance.

These openings are then filled with rock, either before or at the same time as other cuts of the same size are made, alongside of the first ones. A third slice is then taken off, and the second is filled in the same manner; and so on, until the whole first stope is mined out. As the filling must be kept close to the back in order to prevent caving of the ore, it is necessary to shovel most of it. It should, however, be borne in mind, that as solid ore is mined and loose rock takes its place, and as the specific gravity of the ore is at least $1\frac{1}{2}$ times greater than that of the rock, it is not necessary to handle more than four tons of rock for every ten tons of ore mined. As soon as the filling is put in, it is planked over.

Before work is commenced on the second stope, ore chutes and rock-winszes must be prepared. Raises to be used for ore-chutes and ladderways are made from the side of the main level to the top of the second stope, and cross-cuts are driven into the ore. These chutes could be located in the ore and connected with the main levels by cross-outs; but as the tramming will shortly be done by machinery, it is preferable to have the chutes open directly into the levels. The ore-chutes are placed 50 feet from one another, and the rock-winszes are sunk 100 feet apart from the next higher level.

The first thing to do on the second stope is to connect the rock-winszes with the crosscut leading to the ore-chute, after which the ore will be taken out and filling brought in in the manner above described.

A third stope is then prepared and mined in a similar way, and so on until the whole lift is mined out.

On account of the soft character and the great width of the ore, it sometimes cracks off and settles down on the filling. This will not cause much difficulty, if the filling is kept up close to the back on every stope.

If a block of loose ore is met with, it is necessary to put up drift-sets and drive laths, in order to keep the ore from running.

The ore chutes are cribbed up for the first 20 feet large enough to hold about 50 tons of ore, and then narrowed up to a size of $2\frac{1}{2}$ feet square. From this point they are built circular $2\frac{1}{2}$ feet in diameter, by means of wedge-shaped blocks of wood cut out in the saw mill. Care is taken on dumping the ore into the chute that it is not allowed to accumulate and rise in this circular part. Ladderways are cribbed up on the side of each ore-chute.

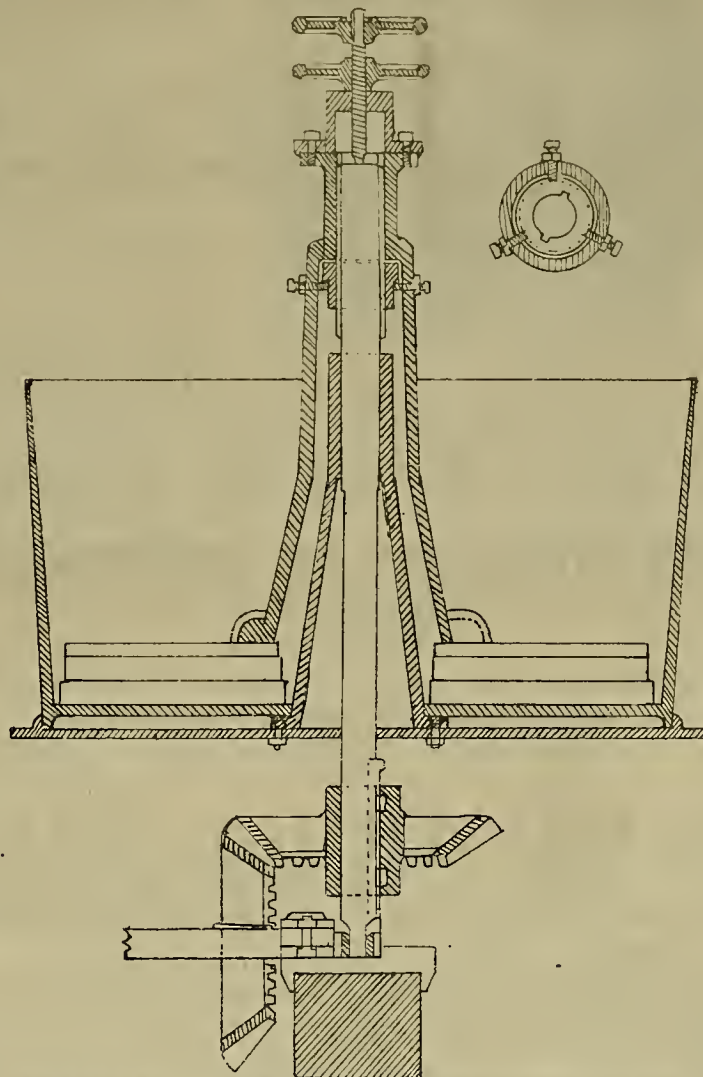
The rock mined in drifts or shafts is, of course, used to fill the excavations in the ore. If, however, this rock is not sufficient, a very suitable filling-material can be obtained from a sandstone quarry near by. The sandstone is trammed to one of the shafts and lowered to the level next above the lift where the ore is mined. From the shaft it is trammed on this level to one of the rock winszes and dumped. It is then drawn on a temporary chute built at the bottom of this winsze, and trammed to its destination.

Fireproof Buildings.

The frequent cases of loss of life and property by fire in so-called fireproof buildings has suggested to G. Lunderschlager, of Sunol, Alameda county, an improvement in construction for hotels, school-houses, factories, tenements, etc., which shall lessen, if not obviate, the danger. In a building which, for instance, is 200 feet front and five stories high, he constructs three partition walls through the whole depth, these being numbered 1, 2 and 3. The stories are also numbered 1 to 5, the partitions

in each story being connected by halls passing through the walls and these being closed by self-acting iron doors. Each partition has a separate exit, including the main and rear entrance. There is an alarm bell in the hall of

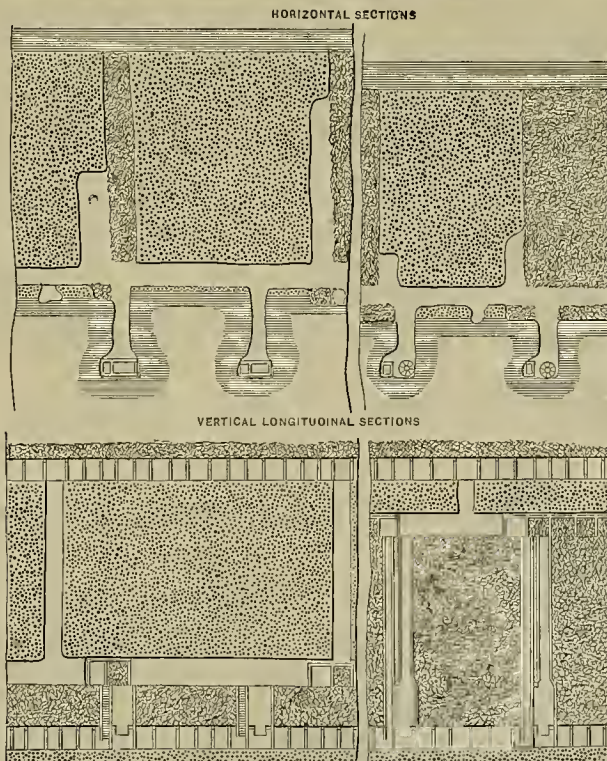
3, and so the occupants of every part of the house know at once where the fire is located and can act accordingly. The walls are double and hollow, pipes connect from the outside with this hollow space, so whatever draft there is



WASHBURN'S ADJUSTABLE COLLAR FOR AMALGAMATING PANS.

each partition in each story, and each of the bells is struck at the same time by the alarm when sounded. At the breaking out of a fire, a general alarm is sounded, after which the first

will be carried up between the walls. The idea is to confine the fire and smoke in one room or on one side of a partition only. That is, it is intended to confine the fire within the partition



TRANSVERSE BACK-STOPING WITH FILLING, IN CHAPIN MINE.

number of peals designates the partition, the second story. Suppose, for instance, a fire breaks out in partition 2, story 3; after the general alarm, the first peal of two shows the partition 2, the second peal of three the story

in which it originated and let the smoke out through the top of the building.

NEARLY every hotel in Southern California is crowded with guests, mostly from the East.

An Oregon Gold Mine.

We were shown recently, by Mr. J. H. Robbins of Baker City, Oregon, a very rich sample of the sulphuret ore from the Elkhorn mine, which is about 15 miles from Baker City. Mr. Robbins has ordered from the Rison Iron Works of this city a 20 ton concentrating plant, consisting of rock-breaker, ore-feeder, Bryen mill, four Frue concentrators and a Feltou wheel, and this will be ready for shipment in about a month. The mill will be put up on Pine creek, some 12 miles from Baker City.

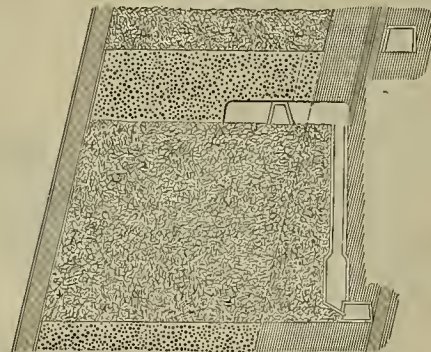
The ledge of the Elkhorn mine is six feet wide, and one foot of it is the very rich ore shown us. They have been shipping this to Denver without concentration, and it has paid them about \$200 per ton above all expenses. The rich portion assays \$350 per ton, mainly gold, although there is from \$10 to \$15 in silver. There is no free gold in the rock. They have shipped 100 tons that netted them \$200 per ton—in fact Mr. Robbins has paid his stockholders \$15 per share on 400 shares, and the company still owns 100 of the 500 original shares. The mine has no debts and pays as it goes. It is a private company and owns four claims. They are running a tunnel, which at length of 700 feet will tap the vein at a depth of 300 feet. No pumping is done, the mine draining itself. There is plenty of wood at the mine, and they have abundant water-power with 160 feet head for the wheel at the mill-site. The mine being close to the railroad, everything is cheap. In shipping the ore to Denver, Mr. Robbins says that he receives six cents on every lot of ore. One foot of this ledge is unnecessary to concentrate, being simply a mass of sulphurets; but with their new plant the whole ledge can be utilized. A specimen of this ore has been placed in the Mining-Bureau museum, where it can be seen by any one.

Adjustable Collar for Pans.

One great trouble millmen have with grinding-pans is to so adjust the driver that it will run true and the shoe and die wear on all sides of the pan alike. Frequently the shoe and die will be worn unevenly, being worn away on one side of the pan while on the other an inch thick remains. This causes a loss of iron, and, moreover, when the driver and muller do not run true good work cannot be done.

T. A. Washburn of Gold Hill, Nev., has recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency an adjustable collar for grinding and amalgamating pans, which is shown in the cut herewith. With this collar the difficulties referred to above are obviated. The set screws can be adjusted in a few minutes' time and the driver made to run true. In putting these collars on the driver, care should be taken to have the set screws come well up under the flange of the collar so as to hold it close up to the neck of the driver. In making new drivers, allowance should be made for a new collar about four inches long. In old drivers, as long a collar as possible should be used so as to wear out the shoes and dies. Set screws made of seven-eighths steel, with jam-nuts, should be used. These collars have just been introduced in the Justice mill, Gold Hill, Nev., and give great satisfaction. Mr. Wash-

CROSS SECTION



burn may be addressed as above for further information.

OAKLAND, Alameda county, expects to have a \$300,000 public building.

FRENCH IMITATION OF WOOD.—French artisans excel in imitating mahogany, ebony and satin wood, says the *Builder and Wood-Carver*. So nearly do they contrive to render any species of wood of close grain like mahogany in texture, density of hue and polish, that many expert judges will often mistake the imitation for the natural wood. The following is the mode: The surface having been planed and rendered perfectly smooth, the wood is rubbed with diluted nitrous acid, which prepares it for the materials subsequently applied. Afterward, to a filtered mixture of one and one-half ounces of dragon's blood, dissolved in a pint of spirits of wine, is added one-third that quantity of carbonate of soda. The whole constituting a very thin liquid, is brushed with a soft brush over the wood. The process is repeated with very little alteration, and in a short interval of time the wood assumes the external appearance of mahogany. If the color position has been properly made, the surface will resemble an artificial mirror, and should this brilliancy ever decline, it may be restored by rubbing the surface with a little cold-drawn linseed oil.

Attention, Southern California Miners.

WORKS FOR SALE.

The Works are situated at Daggett, Cal., in the Calico Mining District, and on the side-track of the Atlantic and Pacific Railroad. They contain a first-class 50-horse power Engine and 45-horse power boiler, with Ore Crusher and other machinery, Mill Scales, Assaying Outfit, etc., all nearly new. Also upon the premises an office building and a comfortable dwelling-house (portable). The above can be had at a bargain. Apply to GILLISPY & CHILDS, 123 California St., San Francisco.

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OUR U. S. AND FOREIGN PATENT AGENCY presents many and important advantages as a Home Agency over all others, by reason of long establishment, great experience, thorough system, intimate acquaintance with the subjects of inventions in our own community, and our most extensive law and reference library, containing official American and foreign reports, files of scientific and mechanical publications, etc. All worthy inventions patented through our Agency will have the benefit of an illustration or a description in the MINING AND SCIENTIFIC PRESS. We transact every branch of Patent business, and obtain Patents in all countries which grant protection to inventors. The large majority of U. S. and Foreign Patents issued to inventors on the Pacific Coast have been obtained through our Agency. We can give the best and most reliable advice as to the patentability of new inventions. Our prices are as low as any first-class agencies in the Eastern States, while our advantages for Pacific Coast inventors are far superior. Advice and Circulars free.

DEWEY & CO., Patent Agents,
220 Market St., Elevator, 12 Front St., S. F.
TELEPHONE No. 658.

A. T. DEWEY. W. B. EWER. GEO. H. STRONG

Paul Dry Amalgamating Barrel Process.

I hereby certify that I made, at the Calaveras mine, a comparative test, as between stamps and silver plates working WET and the Paul Barrel Process working DRY. The quantity of ore worked was 72 tons, all carefully divided and weighed for each test. The result from 36 tons worked by stamps WET was \$24.05 per ton. The result from the 36 tons worked by the Paul process DRY was \$92.00, making a difference of \$67.95 per ton in favor of the Paul Process. The test was as exact as it was possible to make it. GEORGE BOWER.
Room 6, 302 Montgomery St., San Francisco.

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IRON MOULDERS WANTED**
Good Wages.

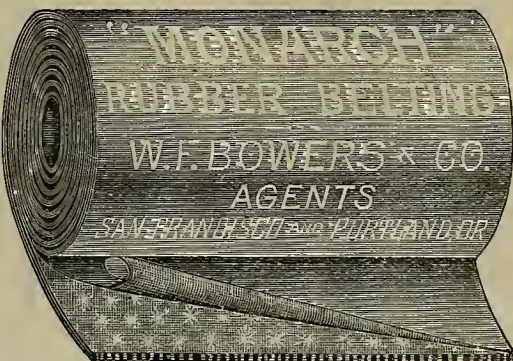
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Monarch Belting.

The Piles of this Belt are

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Each Rivet is Independent

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To Miners, Millmen, Dealers in Machinery, Etc.

The undersigned offers for sale at greatly reduced prices, machinery belonging to the

AUTO-PNEUMATIC CAR MOTOR COMPANY,

Situate in the City of San Francisco, on the block bounded by Folsom, Harrison, Sixteenth and Seventeenth Streets. Said machinery is new and has only been used long enough to test every part of it.

One Compound Steam Air Compressor, low pressure cylinder 12x20, high pressure cylinder 5x20, with inter-cooler and all connections complete.

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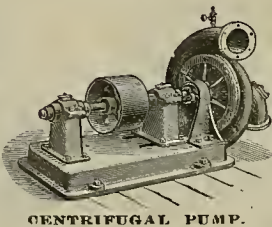
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Manufactured from strictly first-class Flax and pure lubricants. Superior to all others for water and steam. Packs with less friction and makes a tighter joint than any other packing made. Imitations of inferior quality having been put upon the market, we have been compelled to adopt the above trade-mark, and all of our packing now have a RED CORD running through the center its entire length. See that you get it and take no other. Sold by all Hardware dealers. Price, 50 cents per pound. W. T. Y. SCHENCK, Sole Manufacturer, 222 and 224 Market Street, San Francisco, Cal.

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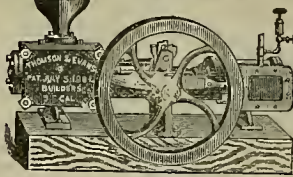
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One new double circular Sawmill to carry 60-inch bottom saw, with wrought-iron hangers for top saw. Friction feed-works, patent steel screw double-throw head-blocks, with track iron, saw carriage and frame complete.

RISDON IRON & LOCOMOTIVE WORKS,

San Francisco, Cal.



THE WOOD WORKER.

Wood-Bending as an Industry.

There are comparatively few persons outside the carriage and boat building interest that know to what an extent the wood-bending business is carried, and the management that is necessary in carrying on a well-arranged wood-bending establishment. Few know that the fine carriages they ride in are very largely made of bent wood. The fellows of all their wheels are bent and made in two parts. The framework of coaches and heavy carriages is nearly all made of bent stock. They are not only better made, but are more cheaply made.

The frames of most of our pleasure boats are bent, and so are many of the frames of some of our finest sailing yachts. Furniture of many kinds has bent frame. All the celebrated Thonet chairs, which for comfort and beauty are not excelled in the world, are entirely of bent wood. The object of bending is twofold—sewing of time and stock, and stability and strength of the work when put together. We ought to add another—beauty of form. Bent carriage shafts are almost, if not entirely, new now, instead of the old-fashioned, clumsy, sawed ones.

It is a business that needs to be well understood, however, to make a success of it. Simply the forms to bend, or the steam-box to soften the wood in, do not make a success of wood-bending. We must know perfectly the nature of the stock to be bent, for stock is so variable that no two pieces bend alike. The length of time to be steamed, also, has much to do with the success in bending. Heavy work needs special care to make it come out in fine shape. The selection of stock, also, must be closely attended to.

Simple as the work seems to be, yet it is full of little details which must be strictly attended to, else the result is a miserable failure. The small number of places where wood is bent as a business, makes it an industry in which there is little competition, and if it is well understood, and the necessary details strictly attended to, it will make good returns for the money invested.—*Wood Worker.*

Out of Style.

Mahogany is now seldom used for furniture. Indeed, it is quite out of style. "A few years ago," said a New York furniture dealer, "no body cared much to buy bedsteads, sideboards, tables, book-cases or sofas made of any other wood than mahogany. Indeed, large pieces of furniture of any of the lighter woods were thought to make a rather vulgar display. The piano was the only exception to this rule. At all times rosewood was the most popular frame for one of these instruments, but this was not due to any notion that rosewood was handsomer, but simply to the fact that the great heaviness and density of mahogany stifled the music. Now black walnut, cherry, ash, oak and every sort of light wood that will take a high polish, are seen in fashionable houses, but of the heavy old wine-colored mahogany rarely a stick. I think it was the musical necessity of using a lighter wood in the manufacture of pianos that caused the revolution in general furniture-making. When people changing their residences saw the difficulty with which pianos were carried to the vans, they began to wonder how much power it would cost to lift them if they were made of mahogany, and this led to the reflection that fully two-thirds of the weight of the entire household furniture might be knocked off if it were manufactured in lighter woods.

"Then began the decadence of mahogany—decadence of its utility as a furniture wood, I mean, for in its integral parts it is almost everlasting. It is undoubtedly the richest, handiest and most stately of all woods, but its popularity has been crushed beneath its own weight. A few conservative people in New York, and many in England, still furnish their houses with it, but such persons are not afflicted with the migratory fever that leads the average American family to seek a new home about once in two years. Mahogany furniture once placed in position, seems to be nearly as immovable as when the dark wood was in its native forests, and the restless, nomadic householder of to-day does not care to be anchored to his dwelling."—*N. Y. Sun.*

KNIFING-IN is a term of comparatively recent origin. Strictly speaking, it refers to a quick process of filling the grain of wood, instead of using rough stuff cut down with block pumice-stone. The paint is mixed quite heavy—really a soft putty—which is brushed on heavy, and after it sets a little it is worked into the wood with the putty knife, and also worked down as level as possible, but left somewhat heavy on the wood. It is allowed two or three days to harden, and is then cut down nicely with sandpaper. If properly done, it stands for the completion of the surfacing process, and it is followed by the color coats. It is better adapted to express wagon bodies than to vehicles having large, plain panels. Express wagon bodies are cut up by the rails into a number of small panels, and unless the panels are filled and "knifed out" before being put in it is most tedious work to rub them out of rough stuff. The paint will dry and cut down sharper if it is composed of one-third fine yellow ochre, and it may be colored to agree somewhat with the color that is

to be used, as lead color, red, green, etc. When mixed tough and allowed time to harden properly it wears very well, but of course it does not afford as much protection to the wood as a heavier body of paint properly applied.—*Painter's Magazine.*

CREMONA WOOD FOR CHAIRS.—A Brooklyn furniture dealer advertises solid cremona chairs. The cremona tree is well known to lumber merchants, and the immense cremona forests, in the heart of Maine, afford employment to hundreds of men every winter. The white cremona is preferred to the pitch variety for making furniture, but the Georgia cremona makes excellent floors. The cremona wood absorbs stain very readily and finishes very well. The cremona tree is a cousin of the Pompadour hick, which furnishes the feathers for the Pompadour fan, and of the Cashmere goat, which furnishes the wool for cashmere dress goods, and the common ancestor of the three is the hainung.—*Ex.*

SHOE PEGS.—One of the great wood-working industries of this country and a rapidly growing one, is the manufacture of shoe pegs. The capital invested in the ten factories engaged in this industry amounts to \$175,000 and gives employment to 300 hands. Within the recent past, large quantities of shoe pegs were imported from England, but now the United States exports to England, as well as to almost every European country. To the uninitiated it will appear as one of the conundrums of the age how they can be produced at the prices they command in the markets, viz.: 35 cents per hundred for those called two-eighths up to 95 cents for eight-eighths.

PROGRESS OF WOOD WORKING MACHINERY.—The march of progress is to be seen in the highest degree in the line of wood-working machinery. Away up and ahead of the front ranks is found the Egan Company of Cincinnati, O. Their original time and labor-saving machines have a heavy and steady demand from not only every section of this country but from the outside world. This firm are builders of wood-cutting machinery of all kinds, and they lead in the production of novel machines.

WOOD-CARVING IN SWITZERLAND.—The industry of wood-carving, according to a recent publication, was introduced into Switzerland some 60 or 70 years ago by a native of Brienz named Christian Fischer, who need to spend his spare time in making trifling objects for sale. He started a night school for the benefit of the neighborhood, and thus laid the foundation of an industry which now gives employment to between 5000 and 6000 persons.

ORDINARY WHITEWOOD can be given the appearance of black walnut by first thoroughly drying the wood and then warming two or three times with a strong aqueous solution of extract of walnut peel. When nearly dried the wood thus treated is washed over with a solution made of one part (by weight) of bicarbonate of potash in five parts of boiling water. After drying thoroughly, rub and polish.

THE COLORADO CANYON.—The engineers who have lately made the successful trip through the Grand Canyon of the Colorado river say that the reports about discoveries of valuable deposits of rock salt and coal are all nonsense. No prospecting for mineral was done. No one familiar with prospecting for ore was with the party after the departure of MacDonald. There may be valuable deposits of mineral along the canyon portion of the river, but not to the knowledge of the party, and there certainly are not large deposits of salt or coal.

A. S. RINGGOLD and his son-in-law, Edward A. Wood, were arrested at Spokane Falls on Friday night for arson. The elder man confessed to a plot, with several others, to burn the town because they were dissatisfied with the distribution of property. Seven five-gallon cans full of coal oil and a quantity of waste and oiled shavings were found in Ringgold's room.

MECHANICS' INSTITUTE.—The Board of Trustees of the Mechanics' Institute met on Saturday evening, and elected the following officers for the ensuing year: Pres., David Kerr; V. P., Irwin C. Stump; Treas., A. W. Starbird; Rec. Sec'y, C. F. Bassett; Cor. Sec'y, S. J. Hendy. The Institute now has 3970 members in good standing.

THE Pless dredger, built at the Globe foundry, Stockton, has been launched. This is the fourth built in that city by W. P. Pless, who has several patents on his dredging machinery.

IN the higher mountain ranges of Colorado they are having a similar experience this winter to California. Immense quantities of snow have fallen, impeding travel and hindering work.

A NUGGET worth \$150 was found in P. Gillie's dam at Los Burro, Monterey county. It will surprise many California miners to learn that there are nuggets in the Coast Range.

WITH snow five feet deep at Sehome, Wash., the people are still obliged to fight a forest fire that has been raging near town for several weeks.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING MARCH 4, 1890.

- 422,683.—CAR BRAKE HANDLE.—C. W. Alden, Stockton, Cal.
422,491.—FARM GATE.—F. W. Beardslee, Berkeley, Cal.
422,897.—FRUIT-DRIER.—W. A. Beck, S. F.
422,698.—CENTRIFUGAL PULVERIZER.—Jos. Behm, San Jose, Cal.
422,727.—CAR-WHEEL AND AXLE.—T. C. Churchman, Sacramento, Cal.
422,576.—KNIFE-BOX RUBBER FOR PRINTING PRESSES.—W. H. Eager, S. F.
422,750.—POLISHING POWDER.—Emma P. Ellis, S. F.
422,581.—QUARTZ-MILL.—J. W. Fairfield, Pacific Beach, Cal.
422,793.—FEED-WATER HEATER.—E. C. Jordan, Sacramento, Cal.
422,817.—CAR LOCK.—E. C. Merrill, Oakland, Cal.
422,831.—GATE.—Wm. A. Pierce, Napa, Cal.
422,630.—HEATING APPARATUS.—J. Rice, San Jose, Cal.
422,892.—CLIP FOR ROPE TRAMWAYS.—R. Rowland, Romley, Colo.
422,636.—SHELL FOR HIGH EXPLOSIVES.—A. W. von Schmidt, S. F.
422,840.—GATER BOOT.—J. Schroeder, S. F.
422,662.—WRENCH.—J. Tomlinson, Folsom, Cal.
422,664.—PHOTOGRAPHIC SHUTTER.—J. R. Trego, S. F.

The following brief list by telegraph, for March 11, will appear more complete on receipt of mail advices:

California—James A. Angwin, Oakland, machine for applying hose couplings; Milton A. Cleman, assignee of Darwin O. Livermore, Los Gatos, ash fastener; Warren E. Mills, S. F., device for loading ships; Viola Moore, S. F., music-stand and portfolio; Joseph L. Stillman, Fresno, ant trap; Joseph S. Turner, San Fernando, ash-fastener; George A. Pratt, Brownville, book index and casing.

Notes.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

PHOTOGRAPHIC SHUTTER.—Joseph R. Trego, assignor of one-half to Henry C. Owens, S. F. No. 422,664. Dated March 4, 1890. This improvement in photographic shutters and the means for operating them consists of an air-impelled piston reciprocating in a cylinder, a piston-rod and slide and a lever connected with the shutter and engaged by said slide, so as to be opened, and mechanism for closing the shutter when released, together with certain details of construction.

CENTRIFUGAL PULVERIZER.—Joseph Behm, San Jose, No. 422,698. Dated March 4, 1890. This invention relates to certain improvements in apparatus for pulverizing ore, and is especially applicable to an apparatus for which letters patent were issued to the same inventor Nov. 6, 1888. This patent covers improvements in construction on the other machine.

QUARTZ-MILL.—Jason W. Fairfield, Pacific Beach, San Diego Co. No. 422,581. Dated March 4, 1890. This is one of that class of mills for crushing quartz and other substances, in which the material is crushed or pulverized within a cylinder or casing by the action of a crushing muller or weight, and the invention consists in the novel construction and arrangement of the parts.

CLIPS FOR ROPE TRAMWAYS.—Robert Rowland, of Romley, Cheffes county, Colorado, assignor to A. S. Hallidie, S. F. No. 422,892. Dated March 4, 1890. This invention relates to that class of clips for use in connection with endless ropeways for carrying the load and container in which a flexible leaf is caused to bend over and tighten upon the wire rope, said leaf being secured to and carried by a body portion, from one end of which the load or container is carried. The general object of the invention is to provide an improved clip of this class in which the parts are all independent and separate from one another, whereby when any part is worn out it may be readily replaced by a new one.

GATE.—Wm. A. Pierce, Napa. No. 422,831. Dated March 4, 1890. The invention relates to that class of gates which are operated by means of suitable connecting cords or ropes, whereby the gate is moved from side to side and close the roadway. The object is to provide a simple and effective gate adapted to be readily and easily operated, moving with but little exercise of power and with the minimum of friction.

CAR-LOCK.—Eugene C. Merrill, West Oakland. No. 422,817. Dated March 4, 1890. This is a locking device for car-doors consisting of a haap connecting the door with the door frame, and having a transverse groove or channel, a vertically sliding bolt or bar engaging said groove and a lock with a bolt which engages and retains the sliding-bar.

KNIFE-BOX RUBBER FOR PRINTING PRESSES.—Walter H. Eager, S. F. No. 422,676. Dated

March 4, 1890. This invention relates to certain improvements in the apparatus connected with printing and folding machines and which is designed to sever the paper at the proper point. It consists of improved elastic supports which are placed in the knife-box upon each side of the knife. In presses which print from continuous rolls of paper a knife is fixed in the knife-box at the proper point so that the paper will be pressed upon the edge of the knife by a roll between which and the knife the paper is passed, and this action severs the paper. This invention consists of a rubber strip made continuous and the upper edge standing at the proper level with relation to the edge of the knife, and in this strip transverse slots or channels are cut. By reason of the cuts or channels in the edges of the rubber through which the points project, the inventor is enabled to make the rubber much more elastic by allowing spaces into which it may be compressed when the pressure is brought upon the edge, and by this means he is enabled to substitute the continuous rubber strip for the wooden strips heretofore in use. It is easily retained in place in the box.

An Improved Quarry Hoisting Engine.

(Continued from page 179)

moving the reversing lever either way from a central position, enabling a man of ordinary intelligence to handle a heavy block of stone of from 10 to 25 tons' weight safely and accurately, as it can be hoisted and lowered exactly to an inch.

For handling smaller blocks of stone, or the ordinary stone boats loaded with small stone, the quick speed can be used for hoisting, while, on attaining the desired height, the clutch may be thrown out of gear, and the stone or boat lowered by means of the foot-brake. All parts of the engine are made, in the manufacturers usual manner, to gauges, and on the interchangeable part system, and finished parts are always kept in stock. The entire engine is built in the most thorough manner to withstand the great strains, and will last for years without the constant expense and annoyance of repairs which are entailed upon the imperfectly constructed engines hitherto used.

Steel or iron wire rope is generally used with this style of engine, from one to two inches diameter, according to the size of the stone to be handled, although chain or hemp rope may be used if desired.

Every engine is thoroughly tested by steam before being shipped. Unless specially ordered, smooth drums are furnished with these engines and not grooved as shown in the engraving. Further information will be cheerfully furnished by the Parke & Lacy Company of this city, the Pacific Coast agents of the Lidgerwood Manufacturing Co.

ABOUT DOWNIEVILLE.—One of our subscribers writing from Downieville, Sierra county, under date of March 4th, says the only mail they have received for a long time was brought on men's backs or snowshoes, so that very little except letters has come through. The stage company are doing all in their power to open the road, and have lost several valuable horses from exhaustion in the attempt. "This is the most severe winter ever known here, the snow lying very deep all around. All business is at a standstill, the principal occupation being shoveling snow and hunting around for wood, which is very scarce."

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write and stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

THE Mohawk Canal & Improvement Company has incorporated to operate the Mohawk canal, situated in Mohawk valley, A. T., and to extend the same for irrigation purposes. Directors—R. H. McDonald, Frank V. McDonald, D. S. Dorn, R. J. Davis and Dr. John C. Spencer. Capital stock, \$1,000,000, all of which has been subscribed.

THE San Francisco Mint is now running under full pressure, and it is estimated that during the present month 600,000 silver dollars will be coined, or about the same amount as was turned out during February. The coinage of gold will not be neglected, and this month about \$2,000,000 worth of the precious metal will be turned into American money.

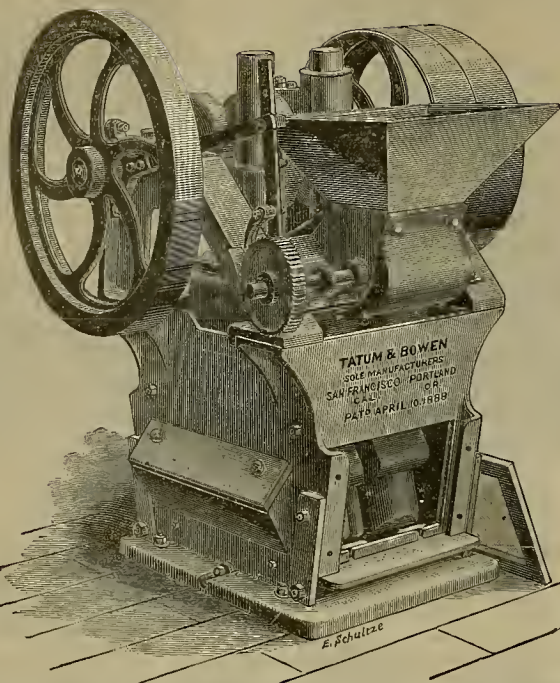
REDUCTION WORKS BURNED.—On Wednesday night the reduction works at Reno, Nev., were entirely destroyed by fire. The loss is about \$70,000, with \$10,000 insurance.

THE little town of Casey Hill, Penn., which was located over an abandoned coal mine, has been wrecked by caves, and a number of people were injured.

THE failure of Belloc Freres' bank in this city was brought about, it is said, by being mixed up in the French copper syndicate trouble.

—THE—
**PERFECTED
 DOUBLE
 Economic
 Quartz
 Mill.**

Attached to each Mill
 is an effective
**Automatic Ore
 Feeder.**



THE CRUSHING is done by the rapid rocking movement in OPPOSITE DIRECTIONS of two heavy castings, the bottoms of which are slightly circular in form, and each provided with our shoes.

The Mill is a closer Gold-Saver and catches a larger percentage of the Clean-up in the Battery than any other Mill.

It costs less, in proportion to what it will do, than any other mill. There are no working parts to buy for it, no matter how long it is used, except shoes and dies. Capacity of Mill, 9 to 10 tons per day. Weight of Mill, complete, 6400 pounds.

We manufacture, to go with the Mill, an

IMPROVED ROCK BREAKER.

Power required for Mill and Rock Breaker, 6 H. P. SEND FOR CIRCULAR. Address

TATUM & BOWEN,
 34 and 36 FREMONT ST., SAN FRANCISCO, CAL.,
 AND PORTLAND, OREGON.
 MANUFACTURERS OF MINING AND SAW MILL MACHINERY.

SAVE MONEY

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WATER POWER TRANSMITTED BY ELECTRICITY

To Run your Mills, Hoists and Trams.

For Circular giving particulars send to

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— MANUFACTURERS OF —

Apparatus for Electric Light and Electric Power

OFFICE, 40 NEVADA BLOCK,

Factory, Stevenson St., bet. First and Ecker.

SAN FRANCISCO, CAL.

ESTABLISHED 1866.

Pacific Chemical Works.

HENRY G. HANKS,

Practical and Industrial Chemist, Assayer
 and Geologist,

718 MONTGOMERY ST., - SAN FRANCISCO.

Will report on the condition and value of any mining property on the Pacific Coast. Rare Chemicals made to order. Instructions given in Assaying and Practical Chemistry



**VAN DUZEN'S
 STEAMJET PUMP**

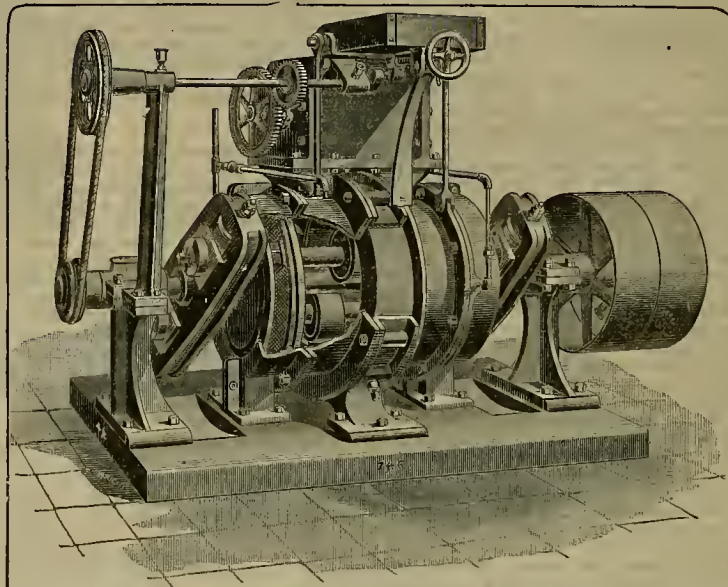
For Water Supply Tanks.
 For Fire Pump on Yard or Switch Engines.
 For Round House General Work.
 For Draining Ponds, Pits, Coffer Dams, etc.
 10 Sizes. \$7 to \$75. Thousands in use.
 Write for Descriptive Pump Circular, V
 VAN DUZEN & TIFF, CINCINNATI, O.

GRANGER'S ROLLER STAMP MILL
 Beats them all. Works dry ores. Makes even granulation. No dead work, hence minimum wear.
 A. P. GRANGER, Denver, Colo.

GRANGER'S DRY ORE SEPARATOR
 The very best. Uses no water. No freezing up. Saves hauling waste. Saves high percentage. Send for circulars.
 A. P. GRANGER, Denver, Colo.

FRISBEE WET MILL.

This Mill, with a weight of less than 9000 pounds, has a capacity of three tons per hour of hard quartz to 40 mesh; has been thoroughly tested; we guarantee its work as represented, and we will give long time trial.



IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS

And renewals will not cost over one-half as much as for stamps. Will run empty, or with small amount of ore without injury. The attention of parties having Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh; 30 to 35 H. P.

OUR DRY MILLS are the most economical ever built, and are extensively used with record of several years. No grinding in pans. Mill finishes to any fineness desired.

FRISBEE-LUCOP MILL COMPANY.

GIDEON FRISBEE, Manager, - - 59 & 61 First Street, San Francisco
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Mining Machinery. Steam Engines.

STAMP BATTERIES, PANS AND SETTLERS, ROCK BREAKERS, ETC., ETC. SAW-MILL, CABLE-ROAD, REFRIGERATING } MACHINERY.

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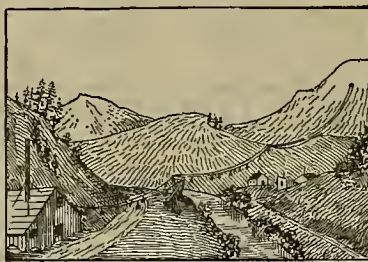
Elevated on Wooden Posts, from 150 to 2000 feet apart, conveying Buckets of Ore, Coal, Wood, etc.

No Possibility of Load Slipping.

Cheapest Form of Transportation.

No road needed; can be run vertically. No power needed if angle of descent be more than 8 degrees.

CAN SPAN GULCHES 2000 FEET WIDE.



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HOISTING ENGINES.

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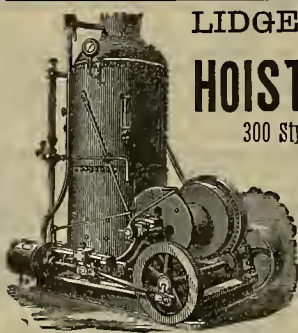
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San Francisco, Cal.



Send for Catalogue.

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 Elevator, 12 Front.

AMALGAMATING MACHINERY.

Stamp Mills for Wet or Dry Crushing. Huntington Centrifugal Quartz Mill. Drying Cylinders. Amalgamating Pans, Settlers, Agitators and Concentrators. Retorts, Bulbion and Ingot Moulds, Conveyors, Elevators, Bruckners and Howell's Improved White's Roasting Furnaces, Etc.

FRASER & CHALMERS, MINING MACHINERY

CONCENTRATING MACHINERY.

Blake, Dodge and Comet Crushers, Cornish Crushing and Finishing Rolls, Hartz Plunger and Collom Jigs. Frue Vanner & Embrey Concentrators, Evans', Calumet, Collom's and Rittenger's Slime Tables. Trommels, Wire Cloth and Punched Plates. Oro Sampo Grinders and Heberle Mills.

IMPROVED CORLISS AND SLIDE VALVE STEAM ENGINES.

✻

BOILERS

HORIZONTAL, VERTICAL ... AND SECTIONAL. ...

IMPROVED STEAM STAMPS

Hoisting Engines,
Safety Cages,
Safety Hooks,

Ore CARS, WATER & ORE
BUCKETS,

Air Compressors,
Rock Drills, Etc.

GENERAL MILL AND
MINING SUPPLIES, ETC.

Sectional Machinery
FOR

MULE-BACK
TRANSPORTATION.



Pumping Engines
and Cornish
Pumping Machinery,

IMPROVED
WATER JACKET

Blast Furnaces for
Galena & Copper Ores,

SLAG CARS AND POTS,

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Pressure Blowers,

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TRAMWAYS.

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SOLE WESTERN AGENTS FOR TYLER WIRE WORKS DOUBLE CRIMPED MINING CLOTHS.

THE PELTON WATER WHEEL

GIVES THE HIGHEST EFFICIENCY OF ANY WHEEL IN THE WORLD.

OVER 800 ALREADY IN USE.

Affords the Most Simple and Reliable Power for all Mining and Manufacturing Machinery. Adapted to heads running from 20 up to 2,000 feet. From 12 to 20 per cent better results guaranteed than can be produced from any other Wheel in the Country.

ELECTRIC TRANSMISSION.

Power from these Wheels can be transmitted long distances with small loss, and is now extensively used in all parts of the country for generating both power and light.

APPLICATIONS

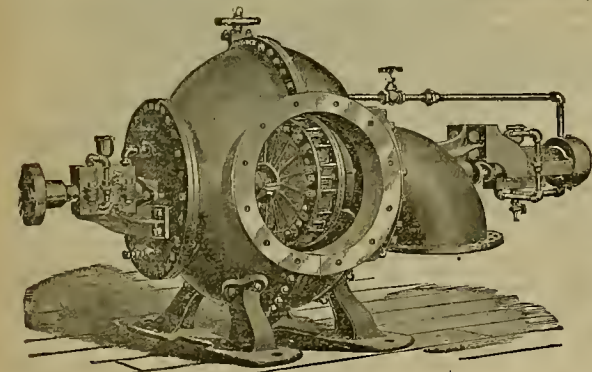
Should state amount, and head of water, power required, and for what purpose; with approximate length of pipe; also, whether the application is with reference to *Wheels* or *Motors* described below. SEND FOR CIRCULARS.

The Pelton Water Wheel Co.

121 MAIN ST., SAN FRANCISCO, CAL.

PELTON WATER MOTORS.

Varying from the fraction of 1 hp to 15 and 20-horse power. Unequaled for all light-running machinery. Warranted to develop a given amount of power with one-half the water required by any other. SEND FOR MOTOR CIRCULAR. ADDRESS AS ABOVE.



JAMES LEFFEL'S Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing. Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case. Further information can be obtained of this form of construction, as well as of the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

JAMES LEFFEL & CO.,

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FRASER & CHALMERS, General Agents,
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CALIFORNIA IRON YARD.

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Successors to CHAS. CALLAHAN

IMPORTERS AND DEALERS IN

CAST AND WROUGHT IRON SCRAP

SECOND-HAND BOILERS
AND OLD MACHINERY
Of every description.

The Highest Price paid for all kinds of Metals.

OFFICE AND YARD: 128 and 130 Folsom St., S. F.
Telephone No. 67.

California Inventors

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THOMAS PRICE & SON,

Assay Office, Chemical Laboratory,

BULLION ROOMS and ORE FLOORS,

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COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

Metallurgy and Ores.**SELBY****SMELTING and LEAD CO.,**

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY And Assay Office.

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

—MANUFACTURERS OF—

BLUESTONE,
LEAD PIPE,

SHEET LEAD,
SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges,
Under Chamberlin Patent.

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ASSAYERS' MATERIALS, MINE AND MILL SUPPLIES,

ALSO CHEMICALS, AND PHYSICAL, SCHOOL AND CHEMICAL APPARATUS.

63 & 65 First St., cor. Mission, San Francisco.

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scoopsterns, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price.

Agents for the Morgan Crucible Co., Baterson, England. Also for E. G. Denniston's Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices. Our Illustrated Catalogue and Assay Tables sent free on application.

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Nevada Metallurgical Works.

NO. 28 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager.

ESTABLISHED 1869

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of Mines; Plans and Reports furnished.

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GREAT REDUCTION!**BATTERY SCREENS.**

Best and Cheapest in America.

No imitation, no deception, no planished or rotten iron used. Only genuine Russia iron in Quartz Screens. Planished iron screens at nearly half my former rates.

I have a large supply of Battery Screens on hand suitable for the Huntington and all Stamp Mills, which I will sell at 20 per cent discount.

**PERFORATED SHEET METAL**

For Flour and Rice Mills, Grain Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Iron, Steel, Copper, Brass. Zinc and other metals punched for all uses.

Inventor and Manufacturer of the celebrated Slot Cut or burred and Slot Punched Screens.

Mining Screens a specialty, from No. 1 to 16 (fine).

Orders promptly attended to.

San Francisco Pioneer Screen Works,

221 & 223 First St., San Francisco, Cal.

JOHN W. QUICK, Proprietor.

WINCHESTER HOUSE.

44 Third Street, - San Francisco, Cal.

This Fire proof Brick Building is centrally located, in the healthiest part of the city, only a half block from the Grand and Palace Hotels, and close to all Steamboat and Railroad Offices.

Laundry Free for the use of Families.

HOT AND COLD BATHS FREE.

Terms, Board and Room, \$1.00 per Day
And Upward.

Rooms with or without Board,
Free Coach to the House,
J. POOLEY.

MARKET REPORTS.

Local Markets.

SAN FRANCISCO, March 13, 1890.

Clear weather has brought in more assortment orders to jobbers, causing the principal business streets to have a more active, lively appearance. The various iron manufacturing industries continue to feel the effects of the iron-molders' strike. This is an unfortunate state of affairs, particularly at this season of the year, when orders for machinery and other iron work are generally placed; yet the surroundings are of such a nature that machine manufacturers cannot give in, for it would only mean many out of pocket and working for glory and paying for the privilege leads to bankruptcy.

The money market is reported to be generally easy, although in some quarters a stringency is reported. Now, with an early prospect of outdoor work soon becoming general throughout the State, and travel resumed to all points, it is claimed that the ease will be still more pronounced under a stimulus of more activity in all lines of trade combined with confidence in the outlook for the future.

MEXICAN DOLLARS—There was a freer export call the past week, with bankers paying 75% to 76 cents to meet their requirements. The steamer that left on last Tuesday for China took out \$487,043.

SILVER—The market the past week continued steady at 95 1/2 cents—the Mint quotation. Exporters, so far as could be ascertained, were not in the market, only the Mint buying. The offerings are still light, due partly to poor transportation facilities, but more largely to the light output of the mines on this coast. The Tuscarora district, which promised, on paper, to be a large producer, now appears to have "fizzled in the pan," if we are to judge by the rapid decline in the price of the mining stocks of that district. The Comstock mines' percentage of silver is decreasing and that of gold increasing. Con. Virginia's goes to gold 50 to 60 per cent, Overman from 60 to 70 per cent, and Crown Point from 42 1/2 to 47 1/2 per cent. The percentage of the other bullion producing mines we are not able to give. If the managers of all the Comstock mines would do the same as the Overman Mining Co. is doing, they would gain more friends among stock-dealers, besides making public information, which aids dealers in bullion to form a better idea regarding the situation. The Overman Company gives the car-sample assays in both gold and silver and the pulp assays in both gold and silver. This is a reform that speaks volumes in favor of the management of that mine, and, as said above, should be followed by other companies.

The silver market abroad and at the East has been declining. This is largely due to the close and uneasy money market abroad and also to a belief that this Congress will not come to the relief of the metal. In this latter conclusion we think they are mistaken. The House Committee is acting on Windom's bill, and it now looks as if the objectionable sections will be amended, which will make the bill perfectly satisfactory to bimetalists. One amendment was made to authorize free coinage when the price of silver bullion reaches par, or \$1 for 37 1/2 ounces of 1000 fine, and a section is added retaining the present legal tender quality of silver coin.

London cablegrams received to-day quote silver at 43 3/4 d, and New York telegrams quote that market at 94 1/2 cts. In our market the Mint was paying to-day 95 1/2 cts. The offerings still continue very light and confined to very small parcels.

QUICKSILVER—Receipts the past week aggregate 211 flasks, and the exports to flasks to Auckland. The home demand is reported to be increasing. The market is strong in sympathy with an advance abroad.

LIME—Receipts the past week aggregate 3465 bbls, and exports 150 bbls. to Honolulu. The consumption is gaining steadily with the call coming from more distant points.

BORAX—Receipts the past week aggregate 182 cts, and exports 676 cts, to Dunedin. The market continues strong under a free demand from the East, where supplies are reported as being light.

ANTIMONY—Our market continues strong. New York advices report supplies still scarce and the market high.

TIN—The market continues weak for plate, although at the close the tone appears to be steadier, due to stocks being better concentrated. The movement to form a syndicate to buy the salmon canneries on the Columbia river may have a bearing on the tin market. Pig tin is without any particular change to note. The market abroad and at the East has held fairly steady. Imports the past week were 200 bxs, plate from New York.

IRON—Imports the past week aggregate as follows: From South Shields 500 tons pig, New York 120 tons. The market is barely steady under few supplies. Eastern and European advices report an easer market with towards the close an improved feeling setting. The high price of fuel abroad is against any material decline in Europe. With us the labor situation is a disturbing element.

COKE—Imports the past week aggregate 1466 tons. The market is fairly steady.

COPPER—The market has shaded off until 14 1/2 cts. in our latest New York quotation. The decline is largely due to the very close and somewhat uneasy moving market abroad consequent upon the renewed call for gold from several quarters. The stock, so far as we can learn, in Europe and in North and South America is decreasing.

LEAD—The market abroad is reported to be in buyers' favor, while at the East it is in sellers' favor. The strength at the East is due to strong holding, rather than increase in the consumption.

COAL—Imports the past week aggregate as follows: Departure Bay 1517 tons, Seattle, 3993, Coos Bay 701, Cardiff 788, Tacoma 2340, Nanaimo 2300. Total, 11,638 tons. The market for Spot Greta and Sydney is slightly higher. The tone for steam coals is very strong with an advance looked for at an early day. For household coals the de-

mand is not quite so free, yet it is of sufficient moment to keep stocks well in hand. There are on the way from Newcastle, N. S. W., for this port 5 vessels, with 5 reported to be loading there. From Sydney there is one vessel on the way and one loading. For San Diego there are four vessels on the way and three loading. For San Pedro one vessel is loading. Of the vessels to arrive the cargoes have all been placed. For prompt shipment our quotations hold good, but for distant shipments lower quotations are obtainable.

Eastern Metal Markets.

By Telegraph.

NEW YORK, March 13, 1890.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday....	44 1/2	96	\$14 10	\$3 92 1/2	\$20 65
Friday.....	44 1/2	95 1/2	14 10	3 92 1/2	20 65
Saturday....	44 1/2	95 1/2	14 05	3 97 1/2	20 50
Sunday.....	44 1/2	95 1/2	14 05	3 97 1/2	20 50
Tuesday....	44 1/2	95 1/2	14 05	3 97 1/2	20 50
Wednesday..	44 1/2	95 1/2	14 25	3 97 1/2	20 40

NEW YORK, March 11.—California borax is firm at 9 1/2 c. Quicksilver follows the advance in London. Sheet Copper—Quiet but steady, at 14 1/2 c. 14 1/2 c for lake. Large sales are reported at the West for electrical purposes. Casting, 12 1/2 c. Lead—Firm. Sales, 600 tons at \$3 95 1/2. Offering not large; the old hypotheated Corwith stock mostly cleaned up.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, March 13, 1890.

ANTIMONY—	25 @	—
BORAX—Refined, in carload lots	7 1/2 @	—
Powdered	7 1/2 @	—
Concentrated	6 1/2 @	—
All grades jobbing at an advance.		
COPPER—		
Bole	23 @	25
Sheathing	23 @	25
Ingot, jobbing	17 @	18
do, wholesale	15 @	16
Fire Box Sheets	23 @	25
LEAD—Pig	4 1/2 @	—
Bar	4 1/2 @	—
Sheet	4 1/2 @	—
Pipe	4 1/2 @	—
Shot, about 10% on 500 base	Drop, 1/2 bag.	1 1/2 @
Buck base	1 1/2 @	—
Chilled, do	1 1/2 @	—
TINPLATE—B. V. steel grade, 14x20, to arrive	—	—
B. V. steel grade, 14x20, spot	4 00 @	—
Chilled, 14x20	6 75 @	7 00
do, roofing, 14x20	6 00 @	—
do, do, 20x28	12 00 @	—
Pig tin, spot, 14 lb.	21 1/2 @	21 1/2
COKE—Eng. ton, spot, in blk.	15 50 @	15 50
Do, do, to load	15 00 @	15 00
QUICKSILVER—By the flask	50 00 @	—
Flasks, new	35 @	—
Flasks, old	35 @	—
CHROME IRON ORE, 1/2 ton	10 00 @	—
LEON—Bar, base	3 @	3 1/2
Norway, base	3 @	3 1/2
STEEL—English, B.	16 @	20
Canton tool	9 @	9
Black Diamond tool	9 @	9
Pick and Hammer	4 @	4
Machinery	4 @	4
Toe Calk	4 @	4
IRON—Cleveland ton	35 @	—
Eglington, ton	35 @	—
American Soft, No. 1, ton	—	35 00
Oregon Pig, ton	—	35 00
Piglet Sound	35 00 @	—
Clay Lane White	27 1/2 @	—
Shots, No. 1	35 00 @	35 00
Bar (iron base price) 1/2 lb.	—	—
Langdon	35 00 @	—
Thorncliffe	35 00 @	—
Chatterlie	35 00 @	—
Barrow	35 00 @	—
Thomas	35 00 @	—
Cargollet	32 50 @	—

Lumber.

Pine, Fir and Spruce.

	WHOLESALE.	RETAIL.
Rough Pine, merchantable, 40 ft.	18 00	18 00
41 to 50 ft.	21 00	21 00
51 to 60 ft.	23 00	23 00
61 to 70 ft.	27 00	27 00
1x3, fencing	22 00	19 00
1x4	21 00	18 00
1x3, 1x4 and 1x6, odd lengths	19 00	16 00
Second quality	17 00	15 00
Selected	24 00	22 00
Clear, except for flooring	31 00	28 00
Clear for flooring	2 00	—
Clear V. G. No. 1 flooring	6 00	—
Firewood	14 00	10 00
Dressed Pine, flooring, No. 1, 1x6	32 00	29 00
No. 1, 1x4	34 00	30 00
No. 1, 1x4, 1x6, and odd sizes	37 00	33 00
All sizes, No. 2	37 00	34 00
Stepping, No. 1	34 00	35 00
Stepping, No. 2	34 00	35 00
hip timber and plank, rough	27 00	18 00
Selected, planed 1 1/2, at 40 ft.	29 00	24 00
" " 2 " " " "	31 00	26 00
" " 3 " " " "	33 00	28 00
" " 4 " " " "	35 00	30 00
Deck plank, rough, average 35 ft.	35 00	32 00
Pickets, average 35 ft.	40 00	35 00
1x1, 4 ft long, 3/4 M	20 00	16 00
1x1, 4 ft long, 3/4 M	6 50	5 00

Coal.

	TO LOAD.	Per Ton.
Australian	7 50 @ 7 75	High Lump, 16 50 @ 17 00
Liverpool	8 50 @	Cumberland blk 16 00 @
Scotch Splint	9 00 @ 9 00	Egg, hard, 15 50 @
Cardiff	9 50 @ 10 00	
	SPOT FROM YARD.	
Wellington	8 90	Seattle, 7 00
Greta	8 50	Coos Bay, 6 00
Westminster Brynbo	9 00	Cannel, 12 00
Nanaimo	9 00	Egg, hard, 18 00
Sydney	8 50	Cumberland, in sacks 15 00
Gilman	7 00	do, bulk, 14 00

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:
Con. California and Virginia, March 7, \$96,742;
Commonwealth, to, \$15,000; Hanauer, 4, \$5559;
Ontario, 4, \$34,395; Savage, 8, \$37,445.

THE unemployed people in San Francisco are being given work in the Golden Gate Park. Citizens have donated thus far \$14,000 for this extra work to relieve prevailing distress among those who have been unemployed during the bad weather.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	No. Am't.	LEVIED.	DELINQ.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Adelaide Copper Co.	Nevada	1.	Dec 31.	Feb 1.	Mar 17.	W. H. Graves.	426 S. Market St.
Bechtel Cona M Co.	California	11.	10. Feb.	10. Mar.	17. Apr.	C. C. Harvey.	303 California St.
Butte King M Co.	California	1.	30. Feb.	13. Mar.	20. Apr.	W. O. Lewis.	723 Market St.
Confidence S M Co.	Nevada	15.	75. Mar.	12. Apr.	16. May.	A. S. Groch.	414 California St.
Crocker M Co.	Arizona	8.	10. Jan.	20. Mar.	6. May.	N. T. Maber.	309 Montgomery St.
East Best & Belcher M Co.	Nevada	11.	25. Feb.	10. Mar.	31. May.	C. E. Elliott.	331 Montgomery St.
Eureka Cons Ditch M Co.	California	1.	3. Feb.	24. Apr.	5. Apr.	21. W. H. Reese.	224 Montgomery St.
Grande Atizo M Co.	Nevada	24.	30. Jan.	27. Mar.	5. May.	R. E. Grayson.	327 Pine St.
Gray Eagle M Co.	California	16.	4. Jan.	21. Feb.	25. Mar.	J. M. Buttington.	303 California St.
Happy Valley Bl. Gravel Co.	California	6.	5. Feb.	12. Mar.	24. Apr.	D. M. Kent.	330 Pine St.
Holmes M Co.	Nevada	11.	25. Mar.	16. Apr.	17. May.	S. C. E. Elliott.	309 Montgomery St.
Martin White M Co.	Nevada	23.	25. Feb.	12. Mar.	31. Apr.	A. B. Cooper.	325 Montgomery St.
Mayflower Gravel M Co.	California	46.	50. Mar.	8. Apr.	10. May.	J. Morizo.	328 Montgomery St.
Occidental Cons M Co.	Nevada	5.	25. Jan.	20. Feb.	25. Mar.	A. K. Dunbar.	309 Montgomery St.
Silver King M Co.	California	2.	30. Jan.	15. Feb.	20. Mar.	A. Waterman.	309 Montgomery St.
Standard Cons. M Co.	California	2.	25. Mar.	4. Apr.	14. May.	J. W. Pew.	310 Pine St.
True Cons M Co.	California	8.	21. Jan.	18. Feb.	15. Mar.	J. C. Bates.	434 California St.
Union Cons M Co.	Nevada	40.	25. Mar.	5. Apr.	10. May.	J. M. Buttington.	303 California St.
Utah Cons M Co.	Nevada	9.	25. Mar.	11. Apr.	17. May.	A. H. Fleh.	309 Montgomery St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Bullion-Beck and Cal M Co.	Nevada	A. Badlam.	322 Montgomery St.	Annual.	Mar 19
California Iron & Steel Co.	California	F. Bonadua.	426 Montgomery St.	Annual.	Apr 21
Chollar M Co.	Nevada	C. E. Elliott.	309 Montgomery St.	Annual.	Mar 17
Evening Star M Co.	Nevada	J. J. Scoville.	349 Montgomery St.	Annual.	Mar 17
Hale & Norcross M Co.	Nevada	A. B. Thompson.	369 Montgomery St.	Annual.	Mar 16
Jackson M Co.	Nevada	W. R. Drake.	322 Pine St.	Annual.	Mar 24

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Champion M Co.	Nevada	T. Wetzel.	522 Montgomery St.	10.	Jan 20
Caledonia M Co.	Nevada	A. S. Cheminart.	328 Montgomery St.	08.	Aug 5
Con California & Va M Co.	Nevada	A. V. Havana.	309 Montgomery St.	10.	Dec 10
Derbec Blue Gravel M Co.	California	T. Wetzel.	522 Montgomery St.	10.	Aug 23
Idaho M Co.	California		Grass Valley.	2 60.	Mar 7
Mt Diablo M Co.	Nevada	R. Heath.	319 Pine St.	30.	Oct 21
Pacific Borax Salt & Soda Co.	California	A. H. Clough.	230 Montgomery St.	1 00.	Feb 10

Mining Share Market.

The mining share market the past week was quite dull for the Comstocks up to Saturday, when there was an upward move with Ophir leading, which culminated on Monday morning. After Monday the market sagged, with short "ups" up to to-day (Thursday), when there was another small jump in the market under the leadership of Ophir. The Tuscaroras sold down heavily with only two small reactions. The break in these stocks was engineered by the pool, so as to get back at lower prices the stock sold out on the advance. It is generally claimed that they will go still lower before there is much in them. The points on the Comstocks are still bearish, although some look for better prices—not much, but some higher—after which there will be lower prices than at any time this year. In the Bodies, Quijotas and other outside stocks there has not been any trading to speak of.

The persons having charge of the work for pumping out the Gold Hill mines, met to-day to perfect plans.

From the Comstock mines our advices are still meagre. The official letter from Belcher reports that a drift has been started in the ledge on the 200-foot level. Our advices report this ledge lying about 500 feet west of former workings, and having a breadth of from 40 to 50 feet of fine looking quartz. It is considered very important. In this ledge numerous crosscuts will be run. The official letter from Crown Point does not report anything of particular interest. The bullion output of the mine in last month netted in coin nearly \$23,000, which is about \$5.50 a ton above milling and transportation charges. At this rate, with the mill running to full capacity, the company ought soon to have a surplus. Official advices from Con. Imperial reports that they are in ore on the 750-foot level. On this level they ran west to intercept the ore found above. From the Yellow Jacket mine information is hard to get, but it is hinted that something of importance can be expected within the next 30 or 60 days, from the drift being run west.

If the company would drift west on or about the 1200-foot level, practical miners say they will find a body of good to rich ore. Favorable information from Alpha and adjoining mines, it is said, is being kept back. In Potosi they are still making an upraise from the 950-foot level to intersect the large body (about 35 feet wide) of ore found on the 750-foot level. The upraise was at last account in \$30 ore. In Hale & Norcross extensive prospecting is being done. In his annual report the Superintendent does not mention the \$35 ore found on the 1250-foot level reported in his January 6th letter. Our advices from Ophir and Mexican are of a more favorable character, as they are from the Sierra Nevada. In the latter mine very important work is going on, which ought to make itself felt soon. Gould & Curry is being more closely watched by experienced miners. During the week several Eastern capitalists or their representatives arrived on the Comstock. What this denotes it is hard to say. A report is current that Consolidated Virginia will lay off about 100 men soon. So far as we can learn there is no truth in this report, for there is yet a large area of unexplored ground which the Superintendent in his last annual report spoke very highly of as promising valuable returns when thoroughly prospected.

From the Tuscaroras our advices are still favorable. They indicate that the Union mill will shut down soon for a clean-up, and also that some improvements will be made in the concentrators. The Commonwealth Company bought the North Belle Isle concentrators, and is working them in with their selected ore. From the Quijotas there is nothing new to report. Official advices from Bodie report more crosscuts started. Private advices continue to speak very hopefully of the prospects.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, department 10, San Francisco:

CAPITAL PACKING Co., March 8th. Capital stock, \$60,000. Directors—Louis B. Parrott, Edgar A. Cohen, Edgar B. Carroll, W. F. Beck and Alfred H. Cohen.

CALIFORNIA REDWOOD LUMBER Co., March 11th. Capital stock, \$250,000. Directors—John M. Dennett, William G. Hawley, Frank F. Burton and Benton Griswold, of San Jose, Herbert Root, of Valley City, N. Dakota, and Michael J. C. Galvin, of Gualala, Cal.

EMPIRE QUARTZ M. Co., March 11th. Location, State of California. Capital stock, \$1,000,000. Directors—George D. Gray, Augustus Judson, J. Elliott Condict, Israel W. Knox and D. H. Jackson.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Feb. 20.	WEEK ENDING Feb. 27.	WEEK ENDING Mar. 6.	WEEK ENDING Mar. 13.
Alpha	.95	1.00	.90	.95
Atta	1.10	1.23	.25	1.30
Andes	.50	.50	.60	.45
Belcher	1.80	1.89	.80	1.99
Best & Belcher	2.70	3.20	.65	3.25
Bullion	.65	.65	.65	.65
Bodie Cons.	.45	.45	.65	.50
Bulwer	.25	.25	.20	.20
Commonwealth	3.55	4.00	.75	3.50
Con. Va. & Cal.	4.70	4.94	.50	4.60
Challenge	.40	1.50	.50	1.40
Chollar	2.40	2.60	.45	2.60
Confidence	.30	.35	.40	.35
Con. Imperial	.30	.30	.43	.35
Caledonia	.29	.29	.20	.20
Crown Point	1.55	1.65	.75	1.80
Crocker	.30	.30	.35	.35
Del Monte	.14	1.55	.35	.17
Eureka Cons.	2.80	3.25	.25	4.00
Exchange	.50	.55	.50	.55
Grand Prize	.25	.35	.40	.40
Gould & Curry	1.40	1.65	.45	1.75
Hale & Norcross	2.75	2.80	.90	2.90
Julia	.25	.25	.30	.25
Justice	1.25	1.45	.10	1.50
Kentuck	.65	.70	.80	.75
Lady Wash	.25	.30	.30	.30
Monito	.30	.30	.40	.35
Monahan	3.55	3.70	.35	3.60
Natsala	.90	1.10	.15	.95
North Belle Isle	.90	1.10	.15	.95
Nev. Queen	.75	.85	.90	1.00
Occidental	.60	.65	.95	.60
Overman	1.60	1.75	.95	1.65
Potosi	3.20	3.75	.15	3.75
Peerless	.20	.25	.25	.20
Peer	.25	.20	.20	.25
Placer	1.55	1.75	.90	1.80
S. B. & M.	1.35	1.55	.60	1.60
Sierra Nevada	1.20	1.45	.20	1.40
Silver Hill	.25	.35	.20	.30
Scorpion	.25	.25	.25	.25
Union	2.25	2.80	.45	2.85
Utah	.60	.70	.85	.65
Yellow Jacket	1.95	2.2	.25	2.15

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"THE HANDY LISTS OF Technical Literature," by the National Publishing and Printing Co. of Milwaukee are exceedingly well arranged, and give the subject, author and publisher of technical and non-technical works on all sorts of subjects. Part II, just issued, covers military and naval science, navigation, sailing, ship-building, etc. With these lists there is no difficulty, even for non-professionals, in becoming informed on the literature of any given subject.

THE NIAGARA MILL AND MINE—The suits brought in Trinity and Shasta counties by W. T. Coleman and wife against Lavinia Sloss and L. L. Baker, as assignees of W. T. Coleman & Co., have been transferred to this county for trial. The Colemans ask for a decree that they hold certain mining property in trust for the Niagara Mill and Mining Company, and that the defendants have no interest in it.

TAKING TOOLS UNDERGROUND—Since the accident in the Yellow Jacket shaft that caused the death of Albert Ballard, superintendent of leading Comstock mines have resolved to enforce the rule to discharge any miner who is detected in taking tools underground when the men are being lowered at the time for changing shifts.

THERE has been a heavy explosion in the Morris colliery at Glamorganshire, Wales, and many miners were entombed.

DELINQUENT SALE NOTICE.

Gray Eagle Mining Company. Location of principal place of business, San Francisco, California. Location of Works, Placer Co., Cal.

NOTICE—There are delinquent upon the following described stock, on account of Assessment (No. 15) levied on the 21st day of January, 1890, the several amounts set opposite the names of the respective Shareholders, as follows:

NAMES.	No. Certificates.	Shares.	Amt.
D E Allison	404	25	\$1 00
D Bowers	310	20	80
D B Wiers	404	500	20 00
R W Hickey	254	20	80
J M Huntington, Trustee	508	4475	170 00
O H Bogart, Trustee	405	4	1 60
O H Bogart, Trustee	447	5000	200 10
O H Bogart, Trustee	470	1000	40 00
O H Bogart, Trustee	471	500	20 00
O H Bogart, Trustee	472	500	20 00
James Clark	401	100	4 00
J W G by, Trustee	181	500	20 00
R W Haines	498	500	20 00
B W Haines	499	500	20 00
W C Hutton, Trustee	506	100	4 00
W C Hutton, Trustee	507	100	4 00
W C Hutton, Trustee	508	100	4 00
W C Hutton, Trustee	509	100	4 00
W C Hutton, Trustee	510	100	4 00
W C Hutton, Trustee	511	100	4 00
Cyrus W Jones, Trustee	421	1000	40 00
John Lindon	84	100	4 00
H M Rosekrans	39	600	24 00
Geo Ross	146	100	4 00
Geo Ross	146	100	4 00
Geo Ross	147	100	4 00
Geo Ross	148	100	4 00
Geo Ross	149	100	4 00
Geo Ross	240	20	80
C S Stout, Trustee	476	2000	80 00
O S Stout, Trustee	477	953	38 12
Mrs M E Stout	170	500	20 00
Mrs M E Stout	184	50	2 00
W A Scarles, Trustee	518	1000	40 00
J N Taylor	102	1000	40 00
Thos Wetzel, Trustee	330	40	1 60
J N Taylor	170	200	8 00
Theo Wetzel, Trustee	225	8	32
Theo Wetzel, Trustee	265	312	12 48
A H Winn, Trustee	466	1000	40 00
A H Winn, Trustee	467	500	20 00
A H Winn, Trustee	468	500	20 00

And in accordance with law, and an order of the Board of Directors, made on the 21st day of January, 1890, so many shares of each parcel of such stock as may be necessary, will be sold at public Auction, at the office of the Company, Room 11, No. 303 California street, San Francisco, California, on MONDAY, THE SEVENTEENTH (17th) DAY OF MARCH, 1890, at the hour of 1 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

J. M. BUFFINGTON, Secretary.
Office, Room 11, No. 303 California street, San Francisco, California.

DIVIDEND NOTICE.

Office of the Pacific Borax, Salt and Soda Company, San Francisco, February 23, 1890.

At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 20) of One Dollar (\$1.00) per share was declared, payable MONDAY, MARCH 10, 1890, at the office of the Company, No. 230 Montgomery Street, Rooms 11 and 12. Transfer Books close March 5, 1890, at 3 o'clock P. M.

ALTON H. CLOUGH, Secretary.

A MIDDLE-AGED MAN by the name of JOSEPH McLEARN, Miner, left Nova Scotia 17 years ago for California. His friends would be thankful to any person who could give any information concerning his whereabouts.

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COAL MINES OF THE WESTERN COAST.

A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

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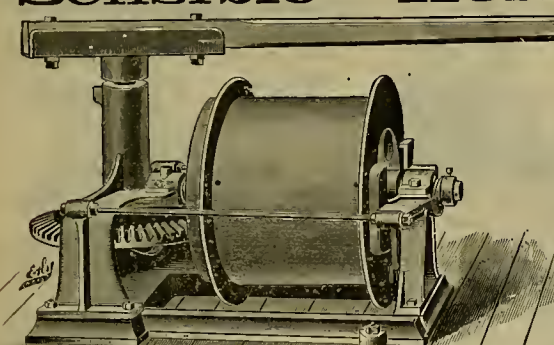
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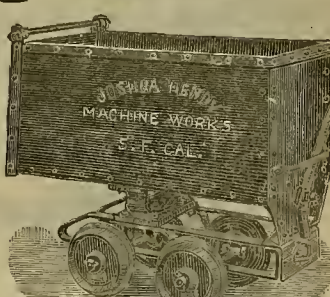
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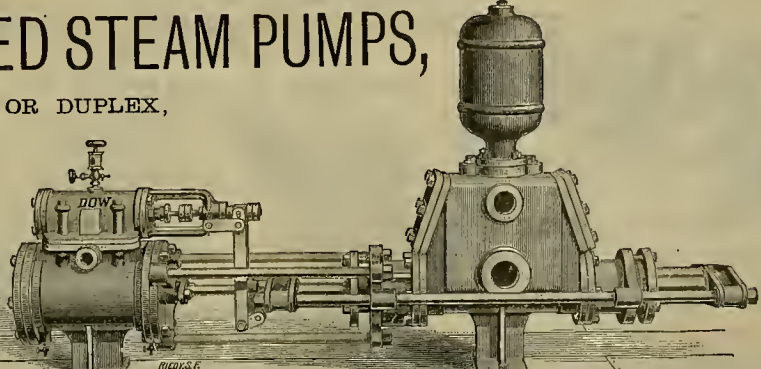
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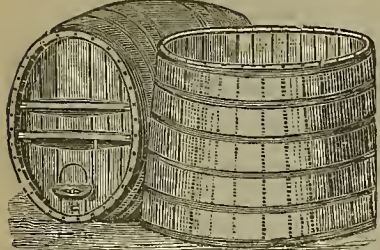
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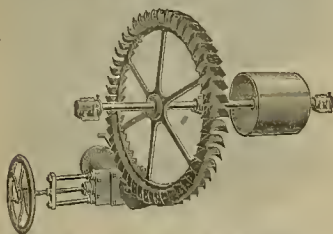


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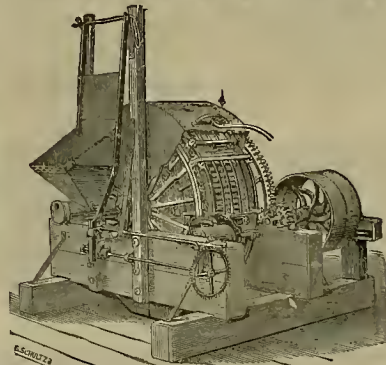
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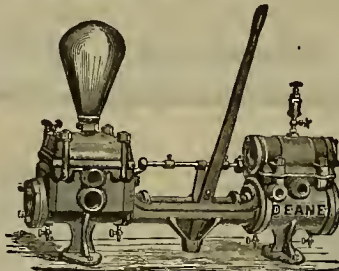
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COAL MINES OF THE WESTERN COAST.

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treating of Pacific Coast Coal Mining, have been ob-
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It was written by W. A. Goodyear, Mining and Civil
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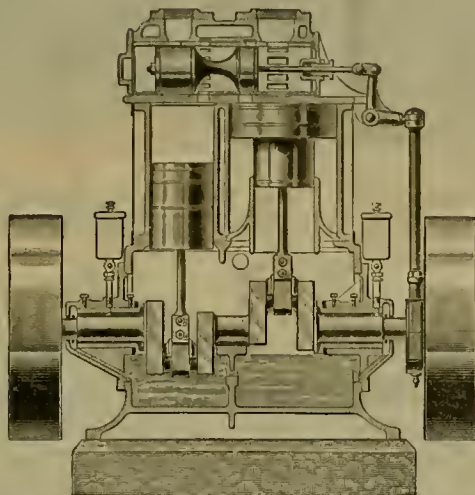
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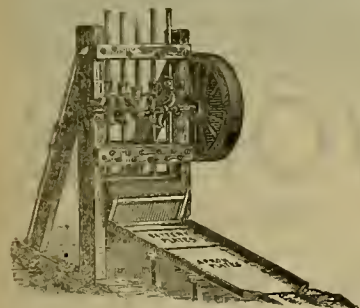
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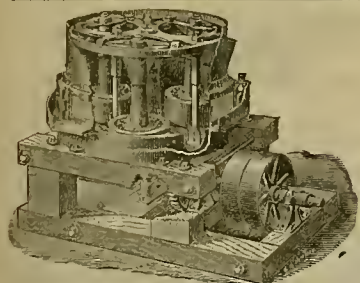
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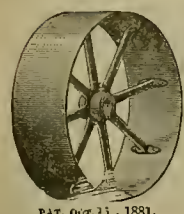
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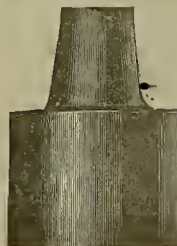
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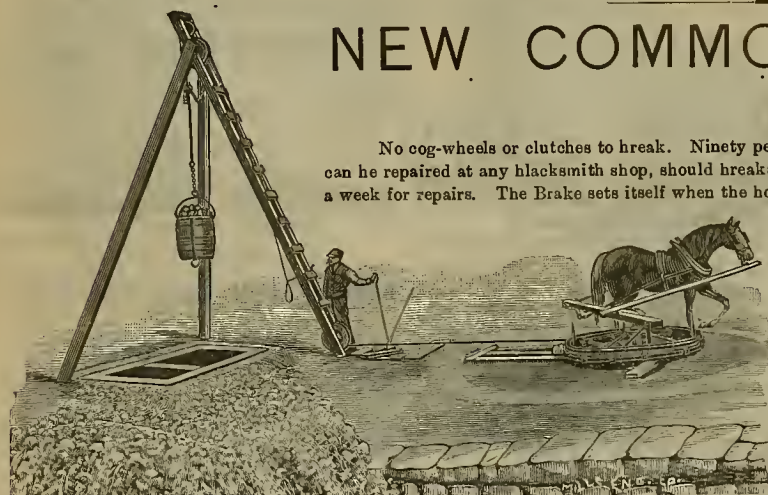
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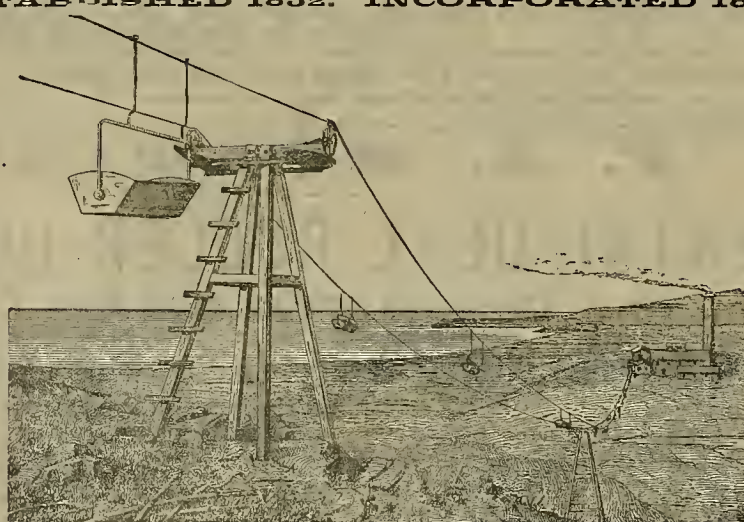
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

VOL. LX.—Number 12. DEWEY & CO., PUBLISHERS. SAN FRANCISCO, SATURDAY, MARCH 22, 1890. Three Dollars per Annum. Single Copies, 10 Cts.



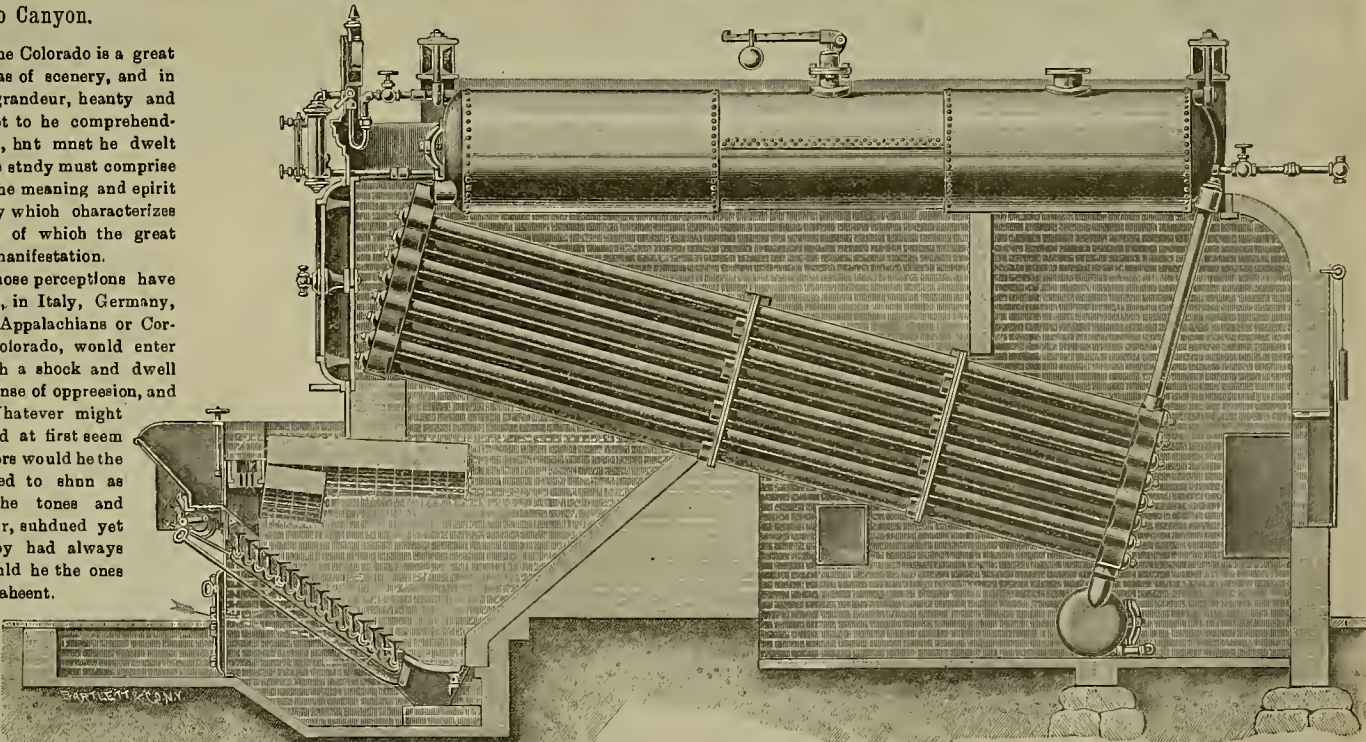
PANORAMA FROM POINT SUBLIME IN THE GRAND CANYON OF THE COLORADO.

The Colorado Canyon.

The Grand Canyon of the Colorado is a great innovation on modern ideas of scenery, and in our conceptions of the grandeur, heauty and power of nature. It is not to be comprehended in a few days or weeks, but must be dwelt upon and studied, and the study must comprise the slow acquisition of the meaning and epirit of that marvelous scenery which oharacterizes the Plateau country, and of which the great chasm is the superlative manifestation.

The lover of nature, whose perceptions have been trained in the Alps, in Italy, Germany, or New England, in the Appalachians or Cordilleras, in Scotland or Colorado, would enter this strange region with a shock and dwell there for a time with a sense of oppression, and perhaps with horror. Whatever might be bold or striking would at first seem only grotesque. The oolors would be the very ones he had learned to shun as tawdry and bizarre. The tones and shades, modest and tender, subdued yet rich, in which his fancy had always taken special delight, would be the ones which are oonepionously absent.

But in time he would become conscious that outlines which at first seemed harsh, have grace and meaning; that forms which seemed grotesque, are full of dignity; that magni-



THE RONEY MECHANICAL STOKER APPLIED TO 250 H. P. BABCOCK & WILCOX BOILER.—See page 204.

(Continued on page 205.)

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—E.S.

"Gold Hath a Place Where They Fine It."

EDITORS PRESS:—Did it never strike you that there is a class of mining men who are constantly endeavoring to get it down "too fine?"—men who will at all times expend \$20 on a ton of \$10 rock that they may assure their employers that by their process "ores can be worked closer than by actual assay." These wise ones are usually sent out by Eastern capitalists. The new superintendent proceeds at once to revolutionize the whole process employed in the treatment of the ores from the mine. Huge buildings are erected, machinery fearfully and frightfully made is freighted in by the ton. At last the new process mill is started and dividends flow in like a steady stream? Well, not exactly! Somehow "there is a wheel too small" (or too large), and "some minor changes will have to be made." Again the wheels revolve, but the promised dividends fail to follow, and then the owners are duly notified that "owing to a change in the ore at water level a few changes will have to be made in the plan of the mill," and to the nearest foundry goes the intricate machinery to be replaced by other equally impractical. Occasionally the superintendent will, in despair, allow his millmen and mine foremen to have their way, and if they succeed will coolly patent their ideas in his own name and prove the old adage that "the wisdom of the superintendent is at times found in the foreman's hat."

The inexperienced superintendent imagines that all of his ideas are new and original. If he were to spend a year in visiting other mines and mining sections he would soon learn that the same processes have been tried and discarded years before. If there is one thing more than another that your fresh superintendent delights in, it is to assert that "by the present methods not one-half of the gold contents of the ores are saved," and that "the bunnling, old-fashioned stamps must go," but they don't, at least not in the way he would have them. That they are "going" into the mills of the largest and most successful mining operators is well known. While the Eastern stockholder may be deluded into believing that the mining operators of the day are running their ores through crude mills by unscientific processes, that they may be amused by hearing the stamps jingle, the California mine owner knows that these practical, hard-headed men, with their superintendents selected from among their own forces are the ones that make mining a success as against the miserable failures of the high-salaried, high-toned, scientific superintendent, who in nine cases out of ten proves himself to be a "theoretical success and a practical failure." "But you must admit that there could be no success without some theory," says my theoretical friend. Agreed, but how large is that "some"? Where shall it begin or end? I was discussing (and Sam cussing) this theory principle with Sam McMaster when he was manager of the Black Hills mines. Said McMaster, "The Freibergers had charge of the Comstock and made a failure of it. We California boys that worked our way up from the pick and shovel, took hold and made it pay. Theory may be all right, but it is a disease. Once a theorist, always a theorist. Our ores carry a small per cent of low-grade sulphurets that would cost more to save and treat than their value. I let them go down the tail race. Your theorist would waste good money saving them. What you can't save in the pan don't try to. Let some theorist spend other people's money doing it." No one ever questioned McMaster's ability, and I have never had occasion to question his judgment. E. H. SCHAEFFER, *Murphys, Cal.*

BUILDING STATISTICS—As an evidence of the advance made by the United States in the direction of providing its dwellers with suitable habitations, etc., it may be mentioned that the value of the building stone produced last year was estimated at \$25,500,000 and that bricks and tile to the amount of \$48,213,000 were made. These materials were stuck together with 49,087,000 barrels of lime, valued at \$24,513,000 and 6,253,000 barrels of American cement worth \$4,533,000. When to these figures is added the enormous amount expended for lumber, house hardware and labor in construction it will be seen that the people of the United States are paying a tidy sum every year for their homes, places of business, churches and other buildings.

DR. PARRY GONE.—Word comes from Davenport, Iowa, that Dr. C. C. Parry, the well-known botanist, died there of pneumonia on the 20th ult. He was a lifelong explorer and discoverer, having come to California in 1850 on the Mexican Boundary Survey. He was among the early investigators in the Rocky mountains, and a continuous laborer in botanical fields in Mexico and the United States. Beside his scientific attainments, his gentle, quiet ways had endeared him to a wide circle of friends, who will join in regretting that we shall no more see his kindly face and hear his pleasant greeting.

Need and Help.

There is perhaps no one duty that requires so much wisdom and delicate care as the distribution of our social charities. Human nature is kindly disposed, and where there is want and misery it is comparatively easy to awaken a warm glow of generous feeling. Money, food and clothing will be freely contributed, but how to distribute these things so as to alleviate poverty and yet not to encourage dependence is the question.

Take an illustration. There is no city so amply endowed with charitable organizations as London, and there is no city in the world so overrun with the most abject mendicancy. Now there is any relation between these two facts? Can it be that one is cause and the other effect? Does that old natural law as old as the granite hills and quite as immovable, the law of supply and demand, hold good here as in the business world? There can hardly be a doubt of it; double the charitable supplies and they will be called for; quadruple them and the demand will keep pace. Such we are told is the history of the social charities of London. On the other hand, Paris has a light-hearted, giddy population that loves to bask in the sunshine and enjoy the pleasures of the passing hour. Here we would naturally expect to find misery more extensive and poverty more degrading, but there is actually less want and of a milder kind. And yet Paris, in comparison with London, is very poorly equipped with benevolent and charitable associations.

Now, this does not show that charity is an evil. St. Paul made no mistake when he placed the crown upon charity and declared it as the noblest of virtues. All those who are in absolute need, the aged, the sick, the helpless and impotent certainly come within its sphere. No one gets so much real happiness, sweetness and fragrance out of life as he, who of his abundance, helps to assuage the sorrows and lighten the burdens of mankind. The benevolence that takes the shape of hospitals, asylums and other humane institutions, so far from being a burden should be considered a debt that society owes to its unfortunate ones. It is more of a blessing to society than a burden that it is stimulated to exercise the fraternal sentiment come into the consciousness of human brotherhood.

But, now while the beauty and loveliness of charity should not be dimmed, but rather made to shine with increasing luster, still the stubborn fact remains that every man is degraded and harmed who has the possibilities of independence within him and yet is encouraged to lean upon some one else. Mrs. James T. Field, who has had much to do with the charities of Boston, in her excellent little work entitled, "How to Help the Poor," says:

"To teach the poor how to use even the small share of goods and talents intrusted to them proves to be almost the only true help of a worldly sort which it is possible to give them. Other gifts, through the long ages tried and found wanting, we must have done with. Nearly a million of dollars, in public and private charities, have been given away in one year in Boston alone; and this large sum has brought, by way of return, a more fixed body of persons who live upon the expectation of public assistance, and whose degradation becomes daily deeper. The truth has been made clear to us that expenditure of money and goods alone does not alleviate poverty."

The author of the admirable work, "Natural Law in the Business World," says: "A sharp line of demarcation needs to be drawn between the poor man and a pauper. There is little necessary resemblance between poverty and pauperism. The worst calamity that can befall a poor man is to become pauperized. He who blindly scatters money in the name of charity is liable to do incalculable harm. On the other hand, he who teaches a man how to help himself, and raises him from the dependent class into that which is thrifty, does society and humanity a great favor." This is the noble work that the Citizens' Relief Committee of this city is just now busily engaged in. The long, cold, rainy winter closed up or greatly curtailed many avenues of employment, and the consequence is that a large number of very worthy poor with dependent families have been unable to find anything to do. To tide this class over a hard spell till business resumes its wonted channels, as it surely soon will do, and at the same time not to make San Francisco the rendezvous of tramps and vagrants, who have been pauperized by intemperance, vice, and crime, is the special work of this committee, and nobly has it been sustained by the liberality of our business men.

SHARKS IN THE ADRIATIC.—The construction of the Suez canal has made a free passage for the sharks from the Indian ocean to the Mediterranean sea. Previous to the construction of that work the only sharks observed in that sea were when some specially enterprising specimen of the fish followed the wake of some vessel around the Cape of Good Hope and through the Straits of Gibraltar.

THE WEALTH OF NATIONS.—The wealth of the United Kingdom of Great Britain is estimated at \$50,000,000,000. If this is correct, the average wealth of the English is largely in excess of that of any other nation. The three most wealthy nations per head of population, stand as follows: Great Britain, \$270; France, \$190; United States, \$160.

California Woolen Manufacturing.

Labor Commissioner J. J. Tobin has made an exhaustive investigation of the decay of wool manufacturing in California. He has found that the reasons why the industry has decayed are: (1) Competition with Europe and the East, (2) higher wages than paid elsewhere, (3) the cost of fuel, (4) the cost of water and (5) ruinous taxation. The report declares:

A little over a year ago we had in California 12 woolen-mills, running 76 carding machines, with a capital of from three to four millions of dollars. At present only half that number are running with a capacity of only 28 carding machines. This is less than half we had ten years ago. According to the United States census for 1880, California had nine woolen-mills, 60 sets of carding, 138 knitting and 16 sewing machines and 18,740 spindles. Capital invested, \$1,676,500. Number of employees, 835.

The Pioneer of San Francisco, by far the largest in the State, having 37 sets of carding machines, or half of the capacity of all our woolen-mills, has closed down, thereby throwing 700 employees out of work. The California Hosiery Co. at Oakland has closed its doors, and more than 100 hands have been thus deprived of their means of living.

The Los Angeles, Santa Rosa, Stockton and Woodland mills are not now running, and of course a large number of weavers, spinners, etc., are deprived of work. It becomes, therefore, a question of grave import as to what the causes are why woolen manufactures cannot thrive in California. To ascertain the facts, an investigation was set on foot by the bureau with the following results:

All the managers, superintendents, etc., of woolen-mills who were interviewed concurred in saying that over or excessive production of woolen goods was the first or primary cause. This is borne out by the statistics published relating to the woolen manufacture and consumption of last year. According to Bradstreet, there were no less than 61 failures of woolen manufacturing concerns during the year 1889, with assets amounting to \$5,651,000 and liabilities \$8,149,000. For the previous year (1888) there were 49 failures, with assets amounting to \$1,723,000 and liabilities to \$3,101,000. On the other hand, the quantity of woolen manufactured goods imported into the United States largely increased during these two years. According to a report issued from the Treasury Department, the average imports for ten months each year from 1884 to 1888 inclusive amounted to \$37,978,862, while in 1889 the amount rose to \$47,167,423.

Capacity Exceeding Demand.

The woolen-mills of California had a producing capacity far in excess of the local demand. One mill alone—the Pioneer—could more than supply the home market. Export trade to British America, Mexico, Central or South America is impossible under existing tariff systems. Unless, then, the woolen-mills of California could successfully compete with Eastern manufacturers, it is manifestly impossible to keep them all running. This they have learned by experience they cannot do. Our manufacturers in California have not only been unable to sell goods to Eastern buyers, but Eastern manufacturers have shipped goods to this market and undersold manufacturers here.

No wonder then that, laboring under all the disadvantages herein enumerated, woolen manufacture has not been a prosperous or even a paying industry in California. Still the time may not be far distant when there will be a market for all the goods that could be manufactured by every mill that was ever started in California. If one of the results of the Pan-American Congress should be the negotiation of reciprocity treaties, whereby our textile fabrics would be admitted free of duty to Mexico and the Central and South American republics, there would be work for every loom and spindle and sewing machine in all our factories.

British Columbia Mines.

The Hon. Mr. Robson has presented the annual report of the Minister of Mines for the year ending 31st December, 1889. It shows that since 1858 to the present time the estimated total yield of gold and silver amounted to \$52,236,753, the gold product of 1889 having been \$588,923, of which \$490,760 were known to have been exported by the banks, leaving some \$98,154 as having been carried away in private hands. The year's estimated yield of silver was \$47,873. The number of miners employed was 1929. Their average yearly earnings have reached \$330. The exporters of the gold referred to were the Bank of British Columbia, \$254,816; Garesche, Green & Co., \$188,580; and the Bank of British North America, \$47,873. The yield in the Cariboo district reached \$217,892, of which \$78,542 are credited to the division of Barkerville, \$41,150 to Lightning Creek, \$37,000 to Quesnelmouth, and \$61,000 to Kintley Creek. Caesar is down for \$54,910; Kootenay (western division), gold \$12,700, silver \$47,873; eastern division do, gold \$36,200; Lillooet, gold \$60,364; Yale, Coquoyos division, \$10,500, gold; Similkameen division, \$35,800; total for Yale, \$46,300.

The reports of the various commissioners deal at greater length with the respective sections, all of them intimating how greatly and

profitably it is possible to extend operations, among the necessary conditions being the reduction of the duty on mining machinery and the providence of improved transportation facilities. The Inspector of coal mines announces that during the year the following mines have been operated; their respective outputs have been: Nanaimo colliery, 223,870 tons, 18 cwt.; Wellington, 273,383 tons, 14 cwt.; East Wellington, 51,372 tons; Union colliery, 31,204 tons. The total output of the year was 579,730 tons, 12 cwt., the coal on hand on Jan. 1, 1889, having been 10,022 tons. The export of these collieries was 443,675 tons; home consumption, 124,574 tons; and on hand last January, 1890, a little over 22,504 tons. The statement shows the output and export of coal from 1887 to 1889:

	Output, Tons.	Export, Tons.
1887.....	413,360	334,830
1888.....	480,300	365,714
1889.....	579,830	413,675

The following statement shows the various sources with quantities of their supply of coal to the State of California from 1887:

	1887, Tons.	1888, Tons.	1889, Tons.
British Columbia.....	324,840	345,681	417,004
Australia.....	155,649	271,612	407,032
England and Wales.....	91,243	126,167	32,893
Scotland.....	12,615	10,680	12,727
Eastern States (anthracite, etc.).....	24,102	30,118	18,950
Puget Sound.....	569,710	568,918	372,614
Cosco Bay and Mt. Diablo.....	89,155	81,194	87,600
Japan.....		13,806	1,340

Totals.....1,217,428 1,448,208 1,351,057

Appended are the respective colliery returns, together with the list of questions submitted by the examiners in Nanaimo under the "Coal Mines Regulation Act."

Coast Industrial Notes.

THE pay-roll of the Olay Water Co. in San Diego is now \$3000 a month.

THE El Dorado flour-mills, Placerville, were burned March 31; loss \$15,000.

A FACTORY for making black lead and indigo blueing has been started in Victoria, B. C.

ROSS' IRON WORKS, Spokane Falls, was burned on the 9th inst. Loss, between \$50,000 and \$60,000.

THEY are quite successful in Stockton, San Joaquin county, with their natural gas wells. A flow has recently been found in the well on the State asylum grounds.

THE Tahoe Ice Co., gathered about 12,000 tons this year, which is about three-fourths of a crop. They have had much trouble with the snow. The ice crop along the Truckee river this season is only about half as much as usual.

THE Centralia (Wash.) News says that the Poget Mill Co. has such immense holdings of timber land that even at its present rate of cutting they will be using their own timber for the next 90 years. In Mason county alone they own 63,000 acres.

THE Salt Lake Tribune says that the Union Pacific railroad will be built into Southern California in less than two years, and that about 2000 engineers, bridge-builders, graders and track-layers will move from that city into Southern Nevada next month for the purpose of building the road.

ELECTRICIAN W. W. SLATER, at West Oakland, is at work on an electrical appliance on several passenger coaches at the pier, which, if successful, will be placed on the cars at West Oakland. The electrical contrivance is an arrangement which is intended to take the place of the bell cord running through the cars.

At the Inyo marble quarry the force is now engaged in getting out tiles for use in the Palace Hotel, San Francisco. The design is attractive, being a yellow center, 10x10 inches, bordered with ten-inch strips of the beautiful variegated moss-agate marble, and having white corners. The contract calls for \$7000 worth of marble.

KING UPTON and F. W. Stanley of Boston, W. R. Garrett of Mansfield, C., and J. A. Boyer of Chicago are said to have been here recently, and in the interest of Swift, the Chicago refrigerator car man and pork and beef packer. Their idea was to interest local capitalists in the enterprise and to establish a big industry along the bay shore.

It is reported that a corporation composed of Eastern capitalists and backed by \$5,000,000 capital has bonded 1400 acres of land at Point Pinole, Contra Costa Co., on the line of the Southern Pacific Railroad, a few miles above this city. An immense beef and pork-packing establishment will be started. J. K. Garretson, a Sioux City banker, is said to be on his way here to complete the preliminary arrangements.

A big financial institution which has no counterpart in this country is soon to be organized in New York. It will have for its principal object the capitalization of industrial enterprises. In fact, it is the intention to reproduce industrial corporations which have within 10 or 15 years opened an enormous field for investment in England. The new institution will have a capital of \$5,000,000, and it will be a joint English and American company, with headquarters in New York and London.

For the first time in the history of the Utsalady mill, Washington, the local demand for lumber is greater the supply which the mill is capacitated to cut, that is more than 100,000 feet per day, and the entire product is consumed on Fidalgo island. The Utsalady mill company has just opened a new yard on the west side of McNaught's ocean dock and Mr.

Owen has opened another lumber yard on the east side of the same dock. A new steam saw-mill is in operation adjoining the Owens lumber yard. Ames Bowman is building a steam saw-mill on the beach in front of his former residence. Several steam sawmills will soon be running on Fidalgo bay.

In the repairs to the Stearns' wharf at Santa Barbara, the piles put down are of eucalyptos trees grown in that city. About a year ago a few piles of this wood were used, and although it is yet too soon for positive results, from all appearances the piles have not been touched by the teredo and seemingly not injured by the water. The trees grow to a great height and are straight and strong, and if the teredo does not injure them, they will soon come into general use for wharf work.

The Alaska canneries have paid well in former seasons, and there were last year 36 of them in operation on the rivers where salmon were plentiful. Last year, however, some of them did well and paid handsome dividends, but the majority returned little profit, and a few hardly paid expenses. This season, so far as known, every cannery in Alaska will be operated, but the increased number will be

mond thinks that though white pine now commands here a larger price than redwood, it cannot remain long so. There is a large area of pine lands, he says, but the area of redwood is very small.

THE seal fishermen who fit out from this port for northern waters are likely to make money this year with any sort of catch. A year ago raw sealskins were freely offered in the market for \$6 apiece. Contracts with the sealers were made, it is said, for even less during the early part of 1889. At present, efforts are being made to contract for the season with the offer of \$10.50 a pelt for the prospective catch. Recently prices have advanced, until it is confidently believed that \$12 per skin will be reached before the season closes. This advance of 100 per cent in the price for sealskins in the past year, it is thought, will stimulate sealers to uncommon exertions, and for this reason that the coming season will be one of the greatest excitement among the hunters of the far north.

The projected extensions and branches of the California-street cable railroad in this city will give an increase of 30,000 lineal feet of track. The double-ended cars designed by the officials

the last \$6000. The water rights, ditches and reservoir were placed at \$45,500, and a dam which is to be constructed to cost \$10,000. The reservoir will have a capacity of 274,000,000 gallons. The ditches will be 19 miles in length and 250 inches of water are guaranteed. The appropriation made by the last Legislature for the purpose of establishing a State reformatory at Lone was \$160,000, so that nearly \$100,000 of the amount will remain for the construction and maintenance of the school after the land and the water rights are paid for.

A New Use for Granite.

A New Hampshire gentleman has brought out a new use for granite, which is described in an exchange as follows:

"We have been shown and have seen some preliminary tests made of a new composition made from finely crushed granite, which, when formed into any desired shape by molding and afterward burned and hardened, is to all appearances harder and as strong and durable as the solid stone itself, which it resembles closely in appearance. The composition is an inver-

by passing between iron rollers. It is not yet determined, of course, how fine or how varied a finish can be given to this material, nor has its durability been demonstrated beyond doubt."

A Kern County Garden.

In Kern county, a region of our State which is fast coming into prominence, natural conditions favor the growth of a great variety of ornamental as well as of economic plants. It is wonderful with what rapidity plantings advance providing soil and moisture conditions are favorable. The attractive engraving on this page gives the reader a glimpse at a plantation of ornamental trees and shrubs at Stockdale ranch, situated about 5½ miles southwest of Bakersfield.

The view includes only a small part of the ornamental plantings on the property. To the left, in the foreground, are pittosporum and bellotrope and to the right are cypress and arbor vitae, while on the extreme right is a beautiful collection of chrysanthemums. Scattered through the middle ground of the picture are roses, tube roses, dahlias, hollyhocks, car-



A COLLECTION OF ORNAMENTAL GROWTHS AT STOCKDALE RANCH IN KERN COUNTY.

small. Only two new canneries, it is thought, will be established. Last season 70 vessels were employed in the traffic, and in all 1500 sailors and fishermen were drawn from this port and transferred for the summer to northern waters. By the middle of April, it is said, this number will have disappeared from this port for at least six months.

SOME idea of the importance of the Alaska traffic can be gathered from the fact that fully 1500 sailors from this port alone are required in manning the fleet. In consequence, during the next month, there will be a considerable lessening of the oversupply of coasting sailors which always exists at this season of the year. No definite or accurate estimate of the value of the productions of Alaska has ever been made. It must amount to several millions of dollars annually. The sealing contract alone is estimated to bring the Government in \$1,000,000, to which must be added the value of the mining, cannery, fur, fish and other interests.

E. S. HAMMOND, a leading lumberman of Duluth, Minn., has all his life been engaged in lumbering in the pine forests of Wisconsin and Minnesota. He is now here for pleasure, but is taking a great deal of interest in the redwood, white pine and fir forests of the Pacific Coast. He has recently visited Alabama, Mississippi and other heavily timbered States of the South. He says the timber there is much inferior to that of the Pacific Coast, particularly so far as the pine is concerned. Mr. Ham-

mond of this company will be put on the new line, and cars of this pattern will run on the California-street road should it be necessary to add new rolling-stock to the present equipment. In addition to the cross-town road, the long-talked-of and much-needed extension of the old line will be made this summer. It will run from the present terminal the five blocks from Kearny to Davis street, and will be a great convenience to those having business at the wholesale houses in that vicinity and will give much better facilities for reaching the ferry. Plans for the new power-house are not finished, but will be ready the latter part of this or the early part of next month. It is known, however, that the structure will be of brick, three stories high, and will compare favorably with any similar building in the city. The new plant of machinery will be one of the finest in the country. All the latest improvements in cable-line machinery, including a 600 horse-power triple expansion engine, will be put in. Every part of the big engine and machinery will be purchased in San Francisco.

THE Prison Directors have decided by a unanimous vote to enter into a contract with B. Isaacs providing for the purchase of the lands, water rights, reservoir and ditches for the proposed reformatory at Lone, Amador county. The price agreed upon was \$61,500. The site covers 300 acres, 100 of which are given to the State, and the remaining 200 are purchased at \$30 an acre, making the price of

tion of a gentleman who does not yet wish to have his name made public. Steps are now being taken to have the process of manufacture patented.

"It is claimed by those who have looked into the matter that all kinds of ornaments for buildings, such as window caps or sills, cornices, friezes, and everything of this nature can be molded to accurate shapes and forms and manufactured by this process at one-tenth the cost of cutting the same out of the solid rock. These ornaments can also be vitrified so that they will take on a permanent gloss as fine as polished granite and at a mere fraction of its cost. Irregular surfaces may be glazed, of course, and many handsome designs made and used for building and other purposes at a very small cost, provided this material is found to be perfectly impervious and durable, as it is now believed to be.

"A hundred ways can easily be thought of in which this material can be used. The samples we have seen are made into paper weights, circular disks, medallions, etc. The composition follows closely the color and texture of the stone from which it is made. Roxbury granite would make a light-colored block, Quincy granite a darker one, and so on through the list. The material may be made from waste stones as well as any, and other kinds of stone besides granite could be used, we presume. The stone would be first crushed in a stone-crusher, and afterward more finely powdered

nations, zinnias, geraniums in great variety, also verbenas, marigolds, nasturtiums, etc. The palms in the picture are readily recognized.

In the background, in front of the tall trees, are hedges of Cherokee rose and pomegranate. In the center, midway between the palms, is the summer-house of honeysuckle and wistaria, and there are besides scores of flowers and shrubs which our enumeration does not include. New settlers in the upper San Joaquin valley can learn much of the adaptation of various plants to their region by a study of the gardens on Stockdale ranch.

NEW AND SMOKELESS FUEL-SAVING PROCESS. It is said that all the region round about Peoria, Ill., is in great excitement over the universal fuel process of destroying smoke and saving coal. Out of 90 tests it is claimed that an average of 40 per cent of the coal has been saved and all the smoke destroyed. The master mechanic of the Rock Island railroad reports after a week's trial that it is a net saving every day of between \$10 and \$12 for each and every engine on the road.

WATCH SPRINGS, piano strings and similar articles are being successfully tempered by electricity. The steel is wound on a spool, placed in an oil bath, and by the electric current kept at the exact degree of redness necessary for the temper required.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

AMADOR GOLD MINE.—*Ledger*, March 16: There is little change to report at this mine. The miners are still on the strike. Not that the owners are desirous of having the men return to work at present, but the money matters between the employees and employers remain in an unsettled condition. Some of the men have been paid one month's wages; others hold out for the full amount due. It is understood that if the latter are not paid before the expiration of the 30 days allowed by law in which to file liens, they will proceed to secure themselves by liens. It is reported that a small force of men will be put to work Monday. Efforts are being made to get the rock-breaker and other heavy machinery hauled from Lone, and with a few days more fine weather it is thought that the balance of the mill machinery can be placed on the ground. We have just heard from undoubtedly reliable sources that sufficient money will be here from London to pay the men in full to-day (Saturday).

THE PLYMOUTH CON.—The Plymouth Con. Gold M. Co.'s report for the year ended Dec. 31, 1889, makes the following fiscal showing:

Gold bullion produced by the mines of this company for the year 1889.....	\$137,335 96
Operating expenses.....	63,747 61
Profit.....	\$43,588 35
Indebtedness Jan. 1, 1889.....	15,446 93

Surplus Jan. 1, 1890..... \$28,141 42
The productive detail by months was as follows:

	Bullion produced.
February.....	\$ 6,750 00
March.....	20,607 44
April.....	20,349 45
May.....	19,123 73
June.....	15,675 07
July.....	25,805 51
August.....	11,779 22
September (cleaning mill).....	14,771 27
October.....	1,039 73
November.....	1,406 93
December.....	

The sole management of the operations at the mine is now, as heretofore, under the care of Messrs. Hayward & Hobart, two of the directors of the company, whose large experience and well-known ability have produced the hitherto brilliant results. The company owns an extensive system of water-works. While this is not immediately available, it is believed that ultimately it will possess considerable value for irrigation and other purposes. About 35 men are now employed.

MISCELLANEOUS.—We are informed that the injunction suit of Wm. Doyle vs. Amador Gold Mine will probably be compromised. The company say they have no desire to intrude upon other persons' rights, and are desirous of settling the matters in dispute without the intervention of the courts. The Summit mine is to be placed with Eastern capitalists if possible. Mr. Stewart of Sutter Creek bonded it some time ago for \$6000, paying \$2000 down. The bond was about to expire when other parties stepped in and paid the balance due and thereby secured a title. The McKenzie mill at Irishtown resumed operations this week after several weeks' idleness on account of the weather.

Calaveras.

SHEEP RANCH.—Cor. Calaveras Prospect, March 15: Mining, ranching and all out-door work of every description has been retarded to a great extent this winter because of, but when spring comes, the balmy day will see much activity displayed. Everybody will be on the jump to do work that has been necessarily left undone. Roads are to be built, timber cut, wood hauled and prospecting done, and it is certain there will be no idle men in the neighborhood then.

El Dorado.

THE TAYLOR.—Cor. Georgetown Gazette, March 13: This mine has been worked more or less for the past 30 years, and has always been considered one of the best mines on this side of the county. Last fall this mine changed hands, and has since been running under the management of W. S. & E. W. Chapman of S. F. These gentlemen seem to be enterprising, go-ahead men, or they would have been discouraged months ago, as the weather has been against them since they first began work. Finding it impossible to get teams in this vicinity to haul lumber through the mud, they brought their own teams from Marysville to do the work, and although the roads have been very bad, they are hauling lumber almost every day. They have in course of erection a 20-stamp mill, with ample room for 20 more if they are needed. The building of the mill is in charge of Millwright James White of S. F. A Mr. Bath of Placerville is foreman of the underground work. In the absence of the superintendent, E. W. Chapman, W. E. Dennison has full charge of the works. About 40 men in all are now employed on the works, with a prospect of many more in the near future.

BEAR CREEK.—Cor. Georgetown Gazette, March 13: Since water is so plentiful a number of fine placer mines have been opened and are paying their lucky owners well. Work is being pushed forward as fast as possible on the Slate Mountain mines, showing the bonderers mean business. The Darling quartz mine stops for nothing.

Kern.

ORE.—Kern Co. Californian, March 15: R. Van Geem and John Dolka are crushing at the Hayes mill in Havilah a 14-ton lot from their mine in the Flying Dutchman district. Johns & Dignan are taking some rich gold quartz out of a claim in the Rand Hill, and will soon crush at the Hayes mill. Five miners are working on the Miller & Welch claim in Bald Eagle mountain near Havilah, and on Monday the pack-train commenced transporting the quartz to the Hayes mill. In Kernville the main shaft of the W. B. Walker mine has been sunk 80 feet within the last two months. The vein in the bottom is 26 inches wide. It has been widening gradually from the top. The footwall is hard and solid and the hanging is now beginning to make in

good shape. The ledge is almost entirely picking ground, though an occasional shot is put in.

Mariposa.

COULTERVILLE.—*News*, March 15: Several men have been set at work on the old Wagoner mine, which changed owners a short time ago. Some rich strikes have been made in pocket mines this season. Mark Parker is credited with taking out 64 ounces in two days. Miner Hilliard of Bull Creek reports favorably of the mining prospects on the north side of the river. People on the north side of the Merced are anxious to see work commenced on the roads and feel as keen an interest in the sale of the bonds as we do on the Mariposa side. Operations on the Bondurant mine will be resumed as soon as Supt. Zukoski returns. His arrival is expected within a few days. The mine was paying when it was closed down in December last. The suspension was temporary and was occasioned by a failure of the wood supply.

Nevada.

MILL.—*Tidings*, March 14: Lord & Co.'s new five-stamp mill on the Spanish mine near Nevada City is about completed. Some excellent ore has been opened up in the mine.

DERBEC.—The Derbec mine at Bloomfield is working with a medium-sized crew, good results attending. Cold weather has made water for washing the gravel somewhat scarce.

WATER.—Supt. Abadie tells us that the flow of seepage water into the North Star is diminishing at the rate of four or five inches daily, and that the pumps are handling the accumulation satisfactorily.

BRUNSWICK MINE.—*Grass Valley Union*, March 15: Major Fitzgerald has returned from San Francisco and says work on the Brunswick mine is to be resumed immediately. Such repairs as are necessary will be made to the machinery, and then the sinking of the new shaft will be continued. The mine is in good condition, and not much will be required in fitting it up for the resumption of work. The intention is to sink the shaft in order to get into more solid ground than was founded the adit level, when drifts will be opened. The reorganization of the company has been completed, and the stockholders are nearly all new men, residents of New York and San Francisco. Henry C. Murray, who was a prominent stockholder in the late organization, has disposed of his interest in the mine. The new company starts under favorable auspices, and intends to do considerable work in the way of development.

FROM WASHINGTON.—*Grass Valley Union*, March 16: Alf, Tregidgo and Geo. A. Hare, superintendents of the Washington and Yuba quartz mines, have reached Nevada City after breaking a trail through the snow from Washington, after being blockaded for several months. They report fresh meat as scarce up there.

BEN FRANKLIN MINE.—E. P. Huchins and J. P. Calkins, who have for some time been looking at quartz properties, left yesterday for home, expecting to return again during the spring months. It is reported that they have negotiated for the Ben Franklin mine, situated on the Osborne Hill range near the lower Colfax road, and that work upon it will be started up during the summer.

GOLD HILL MINE.—It is understood that the work of reopening the Gold Hill mine will be commenced at an early day. The power used will be steam, as there are in place two good engines for hoisting and pumping. A resort to the use of water-power will not be made until such time as the prospects of the mine will justify it.

COE.—*Grass Valley Union*, March 18: There is a probability of work on the Coe mine being started up in a short time, by parties who contemplate purchasing the property outright.

ALLISON RANCH.—There is nothing in a late published rumor of work being started on the Allison Ranch mine. The owners are not inclined to do so, and so far as is known there are no negotiations being made for the property.

WATER.—The troublesome water in the mines is being steadily disposed of, and if there is no renewal of heavy rains the drowned-out levels will be opened up again before a great while. The North Banner mine is again in full operation, and the mill is crushing ore.

WASHINGTON MINING DISTRICT.—Everything points to a lively and prosperous season in the Washington district. Mills will be put up and new mines opened, thereby giving employment to a large force of men. Washington bids fair to become the banner mining district of the county.

HARTERY.—The Larimer mill started yesterday to crush 100 loads of tribute rock from the Hartery mine. Supt. Fowler expects to be able to resume general underground work in a few days, as the water in the mine is under control.

Placer.

NEW MILL.—*Placer Herald*, March 15: The new 10-stamp mill at the Eclipse mine, it is expected, will be ready to start up by the 1st of April. It will be the most complete, substantial and convenient quartz mine in the county. They are down 250 feet on the incline and the rock at the bottom looks fine.

San Diego.

A BIG MINING DEAL.—*Julian Sentinel*, March 14: The sale of the seven mines known as the Gold King and Queen group, four miles from Julian, by Messrs. Meirose, Fielder & Hamilton, to the Cincinnati Belle M. and M. Co. for a good round figure, which was consummated last week, confirms what we have argued all along, that the present year would witness greater developments than the camp has ever known before. The Cincinnati Belle M. & M. Co. is not investing thousands upon thousands of dollars in this camp just for the fun of the thing, but are men who know a good thing when they see it. The camp is to be congratulated upon the acquisition of such enterprising men. That the mines will now be properly developed and worked goes without saying.

Shasta.

OLD DIGGINGS DISTRICT.—Cor. Shasta Free Press, March 12: Work in the Mammoth, under the management of J. M. Haskell, is going on with encouraging outlook. R. G. Hart of the Texas and Georgia mine has returned from Sacramento, having recovered from his late illness. Notwithstanding the bad weather, more mines are working than ever before. A few weeks ago an item appeared in the Free Press speaking about a rich strike in the Hart & Fleming mine. Just so. A month or two ago an account in the Free Press predicted a rich strike in this mine after extending the lower tunnel far enough

to connect with pay chute in upper works. The prediction has been verified and proves that Mr. Hart's theory was correct. It seems the deeper they go down in the Old Diggings the richer and stronger the ore chimneys. A still lower tunnel is being run, giving it another 100 feet of backs. This property is a valuable one and has paid for its own development as well as improvements, which reflects great credit on the management and gives it a record few mines can boast of.

A LIVE CAMP.—The Reid group of mines, consisting of seven locations, have been bonded from the other owners by H. S. Sherard and E. A. Reid. Mr. Sherard is an experienced mining man and was formerly with Haggin & Tevis. He is in charge and working a crew of six men in all, and is getting ready to make a test from the Old California mine. F. P. Satterlee of Shasta is putting the mill in running order and will have charge of the same. W. L. Sharp of Shasta is foreman of the mine.

Sierra.

THE BUTTE SADDLE MINE.—*Tribune*, March 7: A few days ago the miners who took a contract to run a 300-foot tunnel to tap the ledge at a greater depth at the above mine struck the ledge, being in only 170 feet. It is 14 inches wide, and prospects fully as good as on top. It was a great surprise to the contractors and to the company to reach it so soon, as they did not expect it before the 300 feet were run at least. It is believed that as they go ahead the vein will increase in richness and will reach the width that it is on top—about 30 feet. It was thought by some that the vein which was so large and stood out so prominent on top did not go down to any great depth, and consequently the owners were anxious to determine whether this was a fact or not, and so they let a contract last fall to run a tunnel in from the side of the mountain. Now that the ledge has been encountered at that depth, the owners feel satisfied that they will have one of the best mines in the county. The fact that it is so close to the famous Sierra Buttes makes almost every one believe that it is destined to be a good mine.

GOOD OUTLOOK.—*Sierra Tribune*, March 7: Everybody in Sierra City has gone at work now with a vim unequalled for years, and it will not be many weeks before the capitalists, who are so anxiously waiting for spring to open so as to come and develop mines, will be here. The Mountain, Chipp's, Marguerite, Cleveland, Treasure, Salinas and Mercer, San Luis, Northern Bell, Butte Saddle and several other new mines will soon be working, and Sierra City will be the liveliest mining town on the Pacific Coast this summer. We do not make this assertion from mere guesswork, but the mines are developed sufficiently for one to see that the majority of them are bound to become large gold-producers.

Trinity.

QUARTZ IN SOUTHERN TRINITY.—*Journal*, March 15: We mentioned last week the fact that several mineral locations had been made in the Long Ridge country. Prospecting for gold has been carried on in Southern Trinity for many years, and at times the prospectors have had good hopes. It is believed that good cinabar ore exists in the South Fork country, but it has not been much sought for. Mr. Henderson Taylor has a lode near the South Fork which shows free silver for about six feet deep, after which the silver disappears and gold takes its place. Mr. Taylor sent a box of the ore to T. E. Jones, in part of which the native silver can be seen by aid of a glass.

NEVADA.

Washos District.

SIERRA NEVADA.—*Virginia Enterprise*, March 15: On the 630 level a southwest drift is advanced 35 feet from the shaft station.

UNION CON.—On the 1465 level from the north lateral drift, opposite west crosscut No. 4, an east crosscut is advanced 144 feet, the formation changing from hard to soft porphyry.

MEXICAN.—On the 1465 level west crosscut No. 3, 100 feet south of No. 2, from the north drift from west crosscut No. 1, from the main north lateral drift, is extended 170 feet, continuing in a porphyry formation on which is somewhat harder.

OPHIR.—On the 1300 level from the end of the east crosscut from the shaft station a south drift is advanced 459 feet. From the end of this south drift a raise has been carried up 14 feet in quartz from which a few tons of milling ore has been saved.

CON. CALIFORNIA & VIRGINIA.—The 1300, 1435, 1500 and 1600 levels continue to yield the usual quantity of ore. On the 1650 level the northwest drift, now running in a northerly course, is extended 746 feet from the main west drift from the C. & C. shaft. From raise No. 8, 93 feet south from the northwest drift face, continue stopping ore, 30 feet below the connection of that raise with the 1500 level north drift from the Con. Va. shaft. From the raise above the north drift from the south widge, 60 feet down from the end of the south drift below this level, continue stopping ore 20 feet below the track floor. Shipped to the Morgan mill 1121 tons and 1260 pounds of ore, and to the Eureka, 1582 tons and 1560 pounds; battery sample assays showing an average value of \$27.88 per ton. Bullion valued at \$14,297.80 shipped to the Carson Mint. Bullion valued at \$16,700 now on band in assay office.

BEST & BELCHER.—On the 1000 level east crosscut No. 1 is extended 240 feet. Formation, hard porphyry.

GOULD & CURRY.—On the 400 level west crosscut No. 1 is extended 498 feet. Formation, hard porphyry.

NORTHWESTERN CON.—Shaft sunk down to 100 level, bottom in vein matter. Contract let for sinking to 150 level.

ANDES.—The 420 level west crosscut was extended 12 feet the past week. Face shows quartz giving low assays, with clay and porphyry.

NORTH GOULD & CURRY AND EAST BEST & BELCHER.—Usual progress made in advancing the west drift.

SAVAGE.—Shipped 455 tons of ore, showing an average value of \$24.48 by battery sample assays. Bullion on hand valued at \$9750. The February bullion yield of the mine was \$24,073.98. The 300 level south drift is advanced 84 feet from the top of the raise above the 400 level.

HALE & NORCROSS.—Shipped during the week 540 tons of ore showing an average value of \$19.50 per ton by battery sample assays. Extracting ore

from the raise above the 800 level north drift. The 1250 level east crosscut is showing fair-grade ore. The February bullion yield of the mine aggregated \$31,108.56. Bullion on hand valued at \$7333.

CHOLLAR.—The 750 level east crosscut continues in porphyry and the 850 level crosscut in clay and quartz. During the week extracted and crushed at Nevada mill 447 tons of ore, battery sample assays showing an average value of \$24 per ton.

ALPHA.—The 500 level west crosscut continues in porphyry, and the 600 level north drift in the same formation.

EXCHEQUER.—The 500 level north line crosscut is in 135 feet, porphyry showing in face.

CON. NEW YORK.—Top of raise above 800 level is in ore assaying from \$20 to \$25 per ton. The 700 level north drift from raise above 800 level is in fair-grade quartz.

SCORPION.—Advancing a southwest drift from the 630 level shaft station.

POTOSI.—The raise above the 930 level continues showing ore in the top assaying from \$30 to \$35 per ton. The 850 level east crosscut is in porphyry and quartz.

IMPERIAL.—The 300 level west crosscut No. 2 is in porphyry. The 500 level west crosscut is in porphyry. The lateral drift on that level is in quartz.

YELLOW JACKET.—During the week shipped 508 tons of ore, battery sample assays showing an average value of \$20.80 per ton.

CROWN POINT.—Shipped during the week 859 tons of ore, showing an average value of \$17.23 per ton by pulp assays. Are raising above the 160 level to connect with the Kentucky workings.

CONFIDENCE & CHALLENGE.—The 300 level joint west crosscut from the north drift has entered porphyry. The joint Imperial 800 level north drift is being reopened.

BELCHER.—The 850 level east crosscut is in porphyry and clay showing seams of quartz. The 850 level joint east crosscut is in porphyry, clay and quartz. Drifting south on the 200 level for the vein.

SILVER HILL.—The 260 level northeast crosscut from the northwest drift continues in porphyry. Repairs to the 160 level south drift are in progress.

SEG. BELCHER.—The 1000 level east crosscut is in soft porphyry and quartz. The south drift from crosscut No. 2 is in quartz assaying from \$10 to \$20 per ton.

JUSTICE.—During the week crushed 216 tons of ore, battery sample assays averaging \$27.50 per ton.

ALTA.—Crushed 315 tons of ore during the week, battery samples showing an average assay value of \$20 per ton.

OVERMAN.—Shipped 156 tons of ore during the week, showing an average value of \$19.76 per ton by battery sample assays, of which \$10.08 was gold. The raise above the northwest drift is in good ore.

UTAH.—On the 600 level the southeast drift from the shaft station is extended 1031 feet. Formation, hard porphyry.

OCCIDENTAL CON.—Continue to extract ore of good quality from the slopes on the 400 and 450 levels. The raise 100 feet south of No. 3 raise is up 64 feet, and the top is in quartz showing value.

NORTH OCCIDENTAL.—The 550 level joint east crosscut is extended 125 feet. The north drift from the line west crosscut is extended 29 feet and continues in hard quartz showing value.

Flowers District.

LITIGATION.—*Virginia Chronicle*, March 15: The owners of mining locations in Flowers district would have a prosperous year were it not for the suspension of operations through the injunction suit of the Lady Bryan company.

Jefferson District.

DEVELOPING.—*Belmont Courier*, March 12: Notwithstanding the inclement weather, the miners in Jefferson district are still developing their mines and some good ore is being taken out.

Morsy District.

LOOKING WELL.—*Belmont Courier*, March 12: The mines at Morey, Nye county, continue to look tiptop, and the indications are that a great deal of work will be performed on them this year. The ore is high grade and pays handsomely.

Tuscarora District.

NEVADA QUEEN.—*Times-Review*, March 14: North gangway from 600-foot level station has been extended 30 feet.

NORTH BELLE ISLE.—North gangway from the shaft, 600-foot level, has been extended 30 feet.

GRAND PRIZE.—500-foot level. The following extensions have been made: East drift from north crosscut 10 feet; north crosscut from the west north lateral drift, 17 feet; north crosscut from the east front vein, 15 feet without change.

NAVAJO.—South drift from the top of the winze from the 150-foot level extended 17 feet; the vein in the face has divided.

BELLE ISLE.—The crosscut from the 250-foot level, near the Navajo line, has been extended 23 feet. The face is getting harder and is showing faces of ore. The crosscut from the 350-foot level has been extended 19 feet, cutting into a vein in giving low assays. Face still in the vein.

DEL MONTE.—1st level: In north drift from No. 2 crosscut an upraise has been made a distance of 20 feet, showing good ore. North drift from joint crosscut advanced 15 feet, face of drift in low-grade ore. 2d level: Joint crosscut has been extended 6 feet, 3d level: Crosscut from north drift advanced 13 feet, looking favorable.

NORTH COMMONWEALTH.—1st level: South drift from joint crosscut extended 13 feet, exposing good ore, some of which is very rich. South drift from No. 1 upraise advanced 6 feet; face is showing chloride ore. No. 2 north drift from No. 1 east crosscut, advanced 19 feet; some little ore in the face. 2d joint crosscut advanced 6 feet, still cutting through seams of low-grade ore.

COMMONWEALTH.—1st level: East drift from No. 1 north drift extended 13 feet; total from turntable, 109 feet. Face of drift has 2 feet of ore. Stopes are being opened over this drift, and extended 350 feet, from which ore is now being extracted. 4th level: East crosscut from north gangway extended 11 feet; no material change. North drift from south gangway extended 24 feet, and started to crosscut the vein at this point. There are seams of high-grade ore mixed through the rock. Stopes on different levels are looking as well as at any time. Have yielded for the week 829 cars of ore; 525 tons worked at concentrating plant; assay, \$18 per ton. Bullion shipped, \$15.

40.14; bullion on hand, \$15,000. Mill and mine are running nicely.

ARIZONA.

THE OWL HEADS.—Tucson *Star*, March 12: Mr. Ham Light came in from the Owl Heads district yesterday. From him the *Star* learns: The new steam hoist has been completed and is now working. The new shaft is down 100 feet. After 100 feet more is reached a level will be run to connect with the winze now being sunk from the old workings. At the depth of 135 feet in the old workings a rich vein of ore has been struck which has been uncovered 250 feet in length. The ore will mill 80 ounces in silver. Three shifts are working in the shaft and three shifts in the winze. The mill is running steadily, new pans have been put in, and five more stamps will be added soon. The Owl Heads group consists of about 10 mining properties, all with good showings. The Owl Heads district is about 35 miles north of Tucson, and in its successful development Tucson will be the beneficiary from a mercantile standpoint.

COLORADO.

THE COWENHOVEN TUNNEL.—Aspen *Times*, March 11: The great Cowenhoven tunnel that is being driven through Smuggler mountain is making wonderful progress and last week the men came within a foot of breaking the record, making 74 feet. The record spoken of was made in January, when the tunnel was driven 75 feet in one week. The tunnel was then in a hard lime rock and is now in shale that is, perhaps, more difficult to work, as it is filled with arsenical pyrites that grind down the bits and change the gauge. While the shale is very hard, it is so brittle that the shots shatter it and make close timbering necessary. In driving the tunnel it is necessary to break a face of rock that averages about 10 feet square. It was thus necessary to break and move 7400 cubic feet of ground, or more than 500 tons, in making the week's run. The cost of this work was just about \$10 per foot. The company has the very best machinery obtainable and secures the most expert workmen that can be found. The name of the company that is prosecuting this great enterprise is The Cowenhoven M. Transportation and Drainage Tunnel Co., Mr. H. P. Cowenhoven is the president, and the work is under the supervision of D. W. Brunton.

MATCHLESS DEVELOPMENT.—Leadville *Herald-Democrat*, March 12: The development of the Matchless goes on each month without much change, as the vast bodies of ore which they have disclosed in that mine enable them to ship about what they please, and while the greater proportion of the ore mined and shipped from the mine at present is an argentiferous iron, there is a fair percentage of dry silicious ore being shipped, and the mine is being worked at a more than average profit. The entire shipments will probably amount to 35 tons per day, which could be made much greater did the management so desire. A great deal of development work is going forward, particularly in the lower levels.

GUSTON.—Denver *Republican*, March 15: The new Guston mine, of which but little is said, is one of the valuable Leadville properties and makes the following showing: Owing to a snow blockade on the railway, part of December's output of ore has not been shipped to the smelters, but the quantity shipped is 160 tons, and in stock 288 tons, together 440 tons. The estimated value of the ore is \$60,000, while the mine expenses amount to about \$10,000.

IDAHO.

PLACERS.—Elmore *Bulletin*, March 8: A few weeks ago George Wise and G. H. Gergecko sold to a Massachusetts man named S. J. Gordon 160 acres of placer ground for the round sum of \$30,000 cash down. These placers are located in Deadwood basin, about 90 miles northwest of Rocky Bar. There are numerous parties here who know Wise & Gergecko, and who also have often trodden the same ground in past days when they thought it worthless for mining purposes. Just as good placer diggings abound in Rocky Bar district, and the coming spring, with abundance of water, will be a propitious time for miners to pay them attention. Carl von Summerlatt, Wm. Richan, Tim Lynch and Gus Exner are making extensive preparations for working their placer claims in Red Warrior gulch. From present weather indications they will soon have abundance of water for ground-sluicing, and these gentlemen propose to have everything in readiness to take advantage of the limited water supply.

TO HYDRAULIC.—Boise *Statesman*, March 12: Negotiations have at last been completed and the contract has been let for the building of the longest and largest steel flume in this country. It will be built by a company of Spokane capitalists which has been incorporated under the name of Spokane Hydraulic M. Co., of which Mr. John W. Chapman is the president. The flume will be an immense steel pipe 4½ miles long, carrying water from the old California ditch at the head of Pritchard creek, in the Coeur d'Alene mining district above Murray, to the old wash gold diggings. The flume will be made of heavy steel pipe 22 inches in diameter, and will be about 4½ miles in length. This will give tremendous pressure, and reopen some of the old placer mines which are the richest in the Coeur d'Alenes. The work is to be done by little giants. The line of the flume will be down Pritchard creek from above Murray, by the old Dream gulch claims, once noted as the richest gold diggings in the district, to the old site of Eagle City, another deserted gold camp. All of these old wash diggings are on the line of the California ditch, an open box flume that follows all the windings of Pritchard creek and is over 12 miles long, but there is not sufficient pressure to do any heavy mining. Jesse Coulter, an old mining man, has tried for years to interest capitalists in some scheme to pipe the water down so that these diggings, which are known to be very rich, might be worked. It is due to his indefatigable efforts and to the enterprising spirit of some of Spokane's capitalists that the scheme has been carried to completion. After getting figures from all over the country, the contract was finally let to Holley, Mason, Marks & Co. of this city to furnish the steel and build the flume. It has been estimated that 700,000 pounds of steel pipe

will be used, and it will take 40 cars to bring it here. **THE RED ELEPHANT GROUP.**—Wood River *Times*, March 12: What seems to be an entirely separate and distinct vein was struck in the Red Elephant group of mines last Saturday, and the work since done upon it shows it to carry a width of 45 inches of solid galena ore. This new vein appears to run about 20 feet laterally from all other workings. The ore is of the usual high grade found in the group. While in Salt Lake City two weeks ago, Col. Bryan, the superintendent, selected a pumping and hoisting rig for his mines, which will be shipped with the concentrating mill as soon as the snow melts sufficiently to admit of the hauling of heavy loads up Red Elephant canyon. The hoist is of sufficient capacity to sink to a depth of 600 feet, and the mill will have a capacity of 40 tons per day. The capacity of the hoisting, pumping and concentrating machinery can, however, be nearly doubled at any time at comparatively slight expense.

MONTANA.

THE THRUSH.—Butte *Miner*, March 12: This property is situated southwest of the Pollock, and is a very promising prospect. It is owned by Butte parties and is now under lease to J. McNabb and others. So far the mine is only developed by a roof shaft, which was sunk some time ago. The present lessees have not yet cleared the shaft of the 35 feet of water that it contained when they took the lease, but it will be finished to-day.

THE POLLOCK.—The larger portion of the ground belonging to the Pollock company is being worked under lease to various persons, among whom are West Crowell and Chapman, who are working in the tunnel. A short distance farther west two other men are taking out free-milling ore that will average about 25 ounces in silver per ton. The lessees say they are only making wages now, but expect to do better in future.

THE EASTERN.—On the Eastern mine, northwest of the Jersey Blue, three shifts of men are engaged. The shaft is 200 feet deep and levels have been run from the 100 and 150-foot stations. Drifting went on the 200 is now in progress. Indications are now that a body of good ore will soon be encountered in this latter drift. The work is being done by the Eastern Mining Co., composed of six persons.

PICK AND DRILL.—The Hope mill near Phillipsburg is still idle and no one knows when it will resume operations. The amount of development work that will be done this spring and summer on the claims surrounding Butte will startle the oldest inhabitant. The bullion output of the Granite Mountain for the week ending Thursday was 47 bars containing 70,000 ounces of fine silver and 170 ounces of fine gold. The ore in the Cable mine is changing from gold to copper. The ore now runs about 40 per cent copper, and so far 1000 tons have been shipped for reduction. John Berry and M. Gerberg are figuring on building a mill for reducing the ore of the Simpson mine, a rich body which was struck by them a short time ago. The Simpson is located near Rumsey. Rumors of changes in the management of the Granite Mountain are flying thick and fast in and around Phillipsburg. One of the rumors is to the effect that Thomas Wier, superintendent, will soon resign, and that J. B. Risque of the Bi-Metallic will succeed him. The directors of the company, however, have not as yet verified this rumor.

NEW MEXICO.

FREIGHT IN ADVANCE.—Western *Liberal*, March 14: Several carloads of ore which the Standard Mutual Co. loaded for shipment this week were unloaded because the heartless railroad company demanded freight payment in advance or a responsible guarantee that it would be paid at the destination. Wm. B. Henry, a prominent New York journalist, arrived in town Sunday night. Mr. Henry is interested in the Johnny Bull mine at Stein's pass. He expects to do a large amount of development work on the property and probably will soon begin shipping ore from it. Fred W. Beardslee arrived in town this week from San Francisco, and has taken lease and bond on the Ocean Wave, a lead property owned by Bob Williams and situated between town and Pyramid. Mr. Beardslee will put on a pump and hoisting works and soon will be shipping ore from here. This is a fine property and has lain idle only because Bob did not have the capital to put on the necessary machinery to work it to advantage.

AT HILLSBORO.—Kingston *Shaft*, March 15: The mill of Thompson & Gales at Hillsboro runs steadily, and is dropping 20 stamps on ore. The force at the mines is kept recruited to the regular standard. The value of the ore is better than heretofore, and the owners are well satisfied with the production. The yellow bars of gold that are being turned out is the great index to the prosperity of Hillsboro, and invigorate the mining industry throughout that section. The recent discovery in the Brilliant gulch made by Mr. S. S. Call, is supposed to be the vein from which the rich ore found on the Solitaire came from. The vein at present is six feet wide between walls, and is well defined, all the gangue showing more or less mineral. The claim is known as the Sulphide, and was located by Messrs. Call & Marble on the 1st of January, and adjoins the Blackie claim.

OREGON.

BIG ALECK.—Bedrock *Democrat*, March 15: The Big Aleck mine will start up this morning after a stop of 10 days for repairs and the placing of new rolls, which will greatly increase the crushing capacity. The Groux amalgamator has been placed on the property and upward of 300 tons of ore will be run through every 24 hours.

UTAH.

PARK NOTES.—Record, March 15: The indications of greater activity in mining circles the coming summer are growing thick and fast. Many mining claim owners, prospectors and company concerns are already planning operations on large scale and as soon as the weather permits, mining matters will assume a livelier air than ever. Active development work will soon be resumed by Messrs. Hughes & Pogan on their promising group of claims in Woodside canyon. A tunnel has been driven

about 200 feet, and it is estimated that another 100 feet will tap the vein.

THE DRAIN TUNNELS.—The Ontario's big eastern drain tunnel is in about 3700 feet, almost a fourth of the distance. The work is progressing favorably. The Alliance Co.'s drain tunnel is in almost 5000 feet, two-thirds of the way. The formation of the country through which the tunnel runs is very encouraging, and it is different in character to that through which the Anchor tunnel ran. The mine is in splendid condition.

CAMP CROSSCUTS.—The Nevada-Northland leasers are ready to make another big shipment of ore as soon as they can get teams to do the hauling. In the last issue of the *Record* it was erroneously stated that a lot of Bolivia ore had been received at the Ontario mill to be tested by the Russell process, etc. The fact of the matter is that the test is to be made with a view of ascertaining which method of roasting, whether by the Stetefeldt furnace, the Howell or others, is best adapted to this South American ore, and the test has no connection with the Russell leaching process. The Stetefeldt furnace at the Ontario mill was selected in preference to mills in other places, while tests will be made at other furnaces elsewhere. After it is decided which furnace is the best, work will commence on a 100-stamp mill, to be erected by the Bolivia Mining Co., and this will be in addition to the 80-stamp already running. In other respects the item on this subject published last week was substantially correct.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING MARCH 11, 1890.

- 432,106.—MACHINE FOR APPLYING HOSE COUPLINGS.—J. A. Angwin, Oakland, Cal.
423,130.—PNEUMATIC RAILWAY.—M. A. Clennam, S. F.
423,144.—BUTTER CRATE.—W. H. Ferguson, Seattle, Wash.
422,953.—SASH FASTENER.—D. O. Livermore, Los Gatos, Cal.
423,070.—DEVICE FOR LOADING SHIPS.—W. F. Mills, S. F.
421,066.—MUSIC STAND AND PORTFOLIO.—Viola Moore, S. F.
422,971.—BOOK INDEX AND CASING.—G. A. Pratt, Brownsville, Cal.
423,190.—ANT TRAP.—J. L. Stillman, Fresno, Cal.
423,001.—SASH FASTENER.—J. S. Turner, San Fernando, Cal.
423,197.—TORACCO PIPE.—C. D. Weldon, Mica, Wash.

The following brief list by telegraph, for March 18, will appear more complete on receipt of mail advice:

California.—James H. Cullen, Oakland, device for tapping sheet-metal vessels; Artemas A. Kent, assignor of one-half to J. J. Cherrie, San Jose, lawn sprinkler; Francis L. Matthews and D. J. Quinlan, Oakland, adjustable grooving head; Percy W. Rose, Los Angeles, metal railway tie; William C. Stile, deceased, S. F., ore-crushing mill.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

DEVICE FOR LOADING SHIPS.—Warren F. Mills, S. F. No. 423,070. Dated March 11, 1890. This patent covers a novel construction of elevator and means for adjusting and driving it. The object of the invention is to provide a simple and effective elevator for the purpose of carrying goods up a ship's side, and of such a character as to be readily portable from one ship to another, adapted to be easily placed in position, to adjust itself to the rise and fall of the tide and the constant movement of the ship, and to be, as a whole, well adapted for the purpose intended.

PNEUMATIC RAILWAY.—Milton A. Clennam, S. F., assignor of one half to Chas. M. Prevear. No. 423,130. Dated March 11, 1890. This invention relates to certain improvements in pneumatic railways, and it consists essentially of a continuous tube and a novel continuous valve whereby communication may be continuously made and cut off between the tube and the connecting device which conveys the air from the tube to the car and the motor thereon.

MACHINE FOR APPLYING HOSE COUPLINGS.—James A. Angwin, Oakland. No. 423,100. Dated March 11, 1890. The object of this invention is to provide a simple and easily operated power-machine for applying the couplings to hose and securing them in their places. The machine, though applicable to any couplings, is especially intended for the coupling heads and nipples of the hose of railway air-brakes.

Successful Patent Solicitors.

As Dewey & Co. have been in the patent soliciting business on this Coast now for so many years, the firm's name is a well-known one. Another reason for its popularity is that a great proportion of the Pacific Coast patents issued by the Government have been procured through their agency. They are, therefore, well and thoroughly posted on the needs of the progressive industrial classes of this Coast. They are the best posted firm on what has been done in all branches of industry, and are able to judge of what is new and patentable. In this they have great advantage, which is of practical dollar and cent value to their clients. That this is understood and appreciated, is evidenced by the number of patents issued through their SCIENTIFIC PRESS Patent Agency (S. F.) from week to week and year to year.

Working Gold Ores Dry.

In later years there has been more or less interest manifested in the idea of working gold ores dry, and this is now beginning to have a good many advocates. There are two facts which give plausibility to the idea that better results can be obtained by dry than wet working; one, that the larger value of all gold quartz is in fine gold, and very fine at that; the other is, that water, moving down an inclined table, has an irresistible power over this fine gold, and it is quite reasonable to suppose more or less is carried off. Mr. A. B. Paul, who is a close investigator and has spent many years in practically testing this point, asserts that the loss will average over 50 per cent of the free gold product.

We are not prepared to dispute or affirm this declaration; we can only say that Mr. Paul has had a great many years experience in gold mining. There is another fact which presents itself to our mind, and this is, there is a general acknowledgment by our gold miners—even those working improved mills—that they do not get the returns they should from the ores. The same complaint comes from Australia and every other country where gold is mined. Dry working is considered by all odds to be better for the majority of silver ores, and very many mills are in operation reducing their ore dry. So if there are any better results, and enough extra to make dry working more profitable, why, greater profit will likely lead the work into that channel. Mr. Paul branches off and makes a very radical change by not only reducing the ore dry, but he amalgamates it dry, using mercury instead of water. As to his full system, we are not familiar; we only know it is a dry way.

In working gold ores dry, the question comes, Is not dry more expensive than wet working? Then how much more, and will the extra yield of gold give a profit over the extra expense? Then again comes the question of quantity that can be worked, cost of machinery, etc. There are a good many questions to be considered as between wet and dry working. As far as machinery goes for accomplishing a given quantity of work, if we have it not already, the mechanical skill of the time is equal to it. The question all rests on the difference in returns of the precious metals. The subject is an interesting one to our gold miners, and we will be pleased to have their views, pro and con.

A PROSPECTOR'S QUARTZ MILL.—James Day of Chico, Butte Co., Cal., makes a little mill with a patent "vacuum cylinder," a cut of which is shown in our advertising column. The machine can be operated by hand and will amalgamate both in the battery and on the plates. In its mechanical construction, it is like an ordinary California quartz battery. It is not a toy, but a small machine by which a miner can crush his own selected rock, and is calculated to crush 500 pounds per day of 12 hours. The mill weighs 225 pounds and costs \$75. With its accurate tests of rock can be made with less trouble than in an ordinary battery. It is adapted to be run by steam-power or by hand, and will be useful to assayers and samplers as well as miners.

ACADEMY OF SCIENCES.—At the last meeting of the California Academy of Sciences, 350 specimens of fish (100 species) were donated by C. H. Ohm. Dr. Harkness read a paper on the nomenclature of organic life. A branch of madrona from Mount Tamalpais was shown. The leaves, instead of being a deep green, were russet brown, due to the presence of a peculiar fungus growth known as *Rhytisma Arbuticola*. Three years ago this same growth made its appearance. A. Ehrlich presented some curious specimens of sclerotia found in Tulare county 3000 or 4000 feet above the sea level. Dr. Harkness said this vegetable is a puzzle, and exhibits under the microscope nothing but amorphous granules.

REWARDING AN INVENTOR.—By authority of an Act of Congress the Secretary of the Treasury has had prepared a gold medal, to be presented to Joseph Francois, the celebrated inventor of the life-oor. The medal has been struck and is now in the keeping of the Secretary of the Treasury. It possesses greater intrinsic value than either the medal voted to Cyrus W. Field for laying the Atlantic cable, or to General U. S. Grant for his services during the Civil War.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

GOVERNOR WATERMAN has refused to make a legal holiday of May 1st when the Eight-Hour League is to parade. He advises the league to donate the amount the parade would cost to the unemployed of San Francisco.

A BIO strike of excellent ore has just been made in the Little Nellie mine on Iron mountain, Shasta county.

MECHANICAL PROGRESS.

The Rapidly Growing Uses of Wire.

It is a circumstance which cannot have escaped notice that within the past few years the application of wire to different purposes has been widely extended, and there is now a large variety of uses for which it is successfully employed. So general, in fact, has its adoption become that the present has been characterized as the wire age—a term expressive enough to make comment almost unnecessary. This has, in a measure, arisen from the fact that makers of wire have been compelled to look carefully over wide areas for new outlets for the product of their mills. The advance in the efficiency of these mills, including especially the trains for rolling wire rods, within five or six years past, has been something surprising; in fact, it is a clear case of the adaptation of a high speed class of machinery to a line of work which has previously been done at considerably lower speed and at far greater cost for repairs of fixtures than later mills have yet required.

Disregarding some of the more common and well-known uses of wire, as, for example, in the field of applied electricity and the manufacture of wire rope, we find that a large and growing demand for it has sprung up in turning out barbed wire fencing, the manufacture of which, in a comparatively short space of time, has assumed commanding proportions. It is not difficult to realize that in this industry alone enormous quantities of wire are consumed. Wire door mats also have become generally popular, and have been the forerunners of woven wire matting for covering the floors of railroad passenger cars, and for various other purposes which will readily suggest themselves. Cleanliness, durability and economy are points which have been claimed for such matting with good reason, practical test having in every case given highly satisfactory results.

A somewhat unusual application of wire has been made in the construction of ordnance, of which the Longridge wire gun, in England, and the Woodbridge gun, in this country, are interesting examples. While the results of actual firing tests of guns of this type have not been in every way encouraging, the principle of their design has some things to commend it, and the idea may yet be carried out in a thoroughly successful manner. In the Woodbridge gun, a steel cylinder was surrounded by battered steel bars reaching the entire length, and around these was wrapped the wire while under tension.

Another use to which steel wire, in a braided or woven form has been applied, is its adaptation to helting for driving machinery. Some things may be said both for and against this use of the material. Metallic plates or bands have been used more or less for helting for many years, but however perfect their working may have proved in some cases, they are almost beyond hope of repair when trifling weakness begins to show itself. Braided or woven helts of wire could be more easily repaired, and if made of a comparatively firm wire they would in all probability hug a pulley over its entire width more perfectly than any band could when made of plates or sheets. It seems almost unnecessary to remark that the absolutely unyielding nature of the material of which the wire is made at the points of actual contact is wholly different from that of the slightly compressible leather or rubber covered canvas generally used. Hence, it could hardly be expected that equally favorable results should attend the use of the wire fabric until, as has been proposed, the yielding material is supplied in the shape of an elastic cover fitted to the pulley. This, however, introduces in an important manner the element of wear, and the pulley covering would, no doubt, be rapidly destroyed. The question of joint in such helts also has suggested difficulties, all of which, however, would seem to have been in the main overcome. At any rate, wire helts, we understand, are in successful use at Beaver Falls, Pa., driving machinery of various kinds.

As a means of turning out fire-proof stage scenery for theatrical use, wire has found another interesting application. The fire-proofing solutions and paints, hitherto employed in connection with the scenery in current use, have been found insufficient from the fact that they are unreliable, and further, are frequently objectionable because of their destructive action on the materials to which they are applied. As a substitute for these latter, therefore, the fabric employed for the familiar wire window screen suggested itself, being thin and flexible, almost like canvas, and admitting, when closely woven, of being decorated by scene painters in the ordinary way. The only objection which appears to have presented itself was in the circumstance that the wire gauze may be easily seen through. To overcome this, however, a special paste has been prepared, which is of light weight, and, when applied to the gauze, effectually closes up all the small openings. It, moreover, does not detract from the flexibility of the fabric, nor does it injuriously affect its fireproof character. Besides all this, we are told, the paste, when once applied, does not crack. Wire gauze scenery prepared in this way will, according to German report, shortly be used in an experimental way in the court theater at Munich.—*Railroad Gazette.*

THE WELDING OF IRON AND NICKEL.—Iron is now plated with nickel by pressure between rolls at a welding heat. The nickel is recovered from the clippings and shavings of the plates by the action of dilute sulphuric acid at a temperature of 55° C. The iron is dissolved and the nickel is obtained in the form of thin sheets as it was welded upon the iron. The operation is complete when the evolution of hydrogen ceases. Even fresh acid, at the same temperature, has practically no further effect. The separation of the two metals is apparently perfectly made; but a curious fact is noted. When the residual nickel is examined chemically, it is found to differ from its original composition, the amount of iron present being notably increased. For example, in a nickel containing originally only 0.9 per cent of iron, two per cent more was found when it was recovered from the plate cuttings; and even by a long-continued treatment with dilute acid, the iron could not be sensibly reduced. This peculiar behavior pointed to the possibility of actual chemical combination taking place between the metals, and that alloys of iron and nickel were produced in the welding, as it is well known that iron, with even a small proportion of nickel, resists the action of acids better than the pure metal.

WEAR OF TIRES.—Experiments which have been made recently on the Austrian state railroads, with wheel tires of Krupp's crucible cast-steel and Martin steel, have yielded interesting results. For the purpose of the trials, three wheels on one side of a locomotive were furnished with tires of one kind of steel, and those on the other side with tires of the second kind. The profiles, to start with, were, of course, exactly alike. After two years' running, measurements of the profiles showed that the Krupp steel tires had worn down on an average 10 millimetres (about 0.4 in.) while the Martin steel tires had worn down 14 millimetres (about 0.56 in.). Including the weight of the metal removed in again turning down the tires the normal profile, the weight lost, due to wear, was 40.4 kilograms (88.85 lb.) in the case of Krupp tires, and 56.4 kilograms (124.08 lb.) in the case of those of Martin steel.—*Toronto Hardware.*

A NEW MACHINE FOR CUTTING IRON.—A machine for cutting up round or flat iron and steel, and much needed in mill work, has been invented, says the *Rockville, Conn., Journal*. It cuts round iron or steel from one-quarter to one-half inch and flat up to quarter inch, as easy as one cuts a piece of card with pocket scissors. There is an opening for each size of round, while a drawing shear cuts the flat. There are several unique movements and points in connection with the machine which must be seen to be appreciated, especially the return of the blade after a cut has been made, and which is made without any springs to offer any resistance to the cutting motion. A great advantage and saving of time results from the finished manner in which the work is left after the cutting.

COMPOUND LOCOMOTIVES.—The Chicago, Burlington & Quincy mechanical department have designed a new compound locomotive which they expect to build soon. The high-pressure cylinder will be 19 inches and the low-pressure cylinder 29 inches diameter. They intend using a cast-steel piston in the low-pressure cylinder to keep down the weight. The valves will have a travel of six inches. The high-pressure valve will have 1-16 inch outside lap and the low-pressure valve 15-16 inch. Both valves will have 3/4-inch inside lap. In full gear the lead of the high-pressure valve will be 3/4-inch and that of the low-pressure 3-16 inch.—*National Car Builder.*

COOLING STEEL TO SOFTEN IT.—To beat a piece of steel to a low red heat, and lay it away to cool for a day or two, may be all well enough when it is to be made soft by the operation, provided it has been allowed to cool gradually all the while, but the chances are that it has cooled more in the first five minutes than all the rest of the time combined. Get a good non-conducting material for this purpose and be sure and have it dry and hot.—*Ec.*

CHROMIUM STEEL FOR ARMOR PLATES.—Great interest has been excited in both English and French naval circles by a new invention in armor plates. The new armor is said to be an alloy of steel with chromium and an unknown substance, and has a tenacity equal to wrought iron combined with the hardness of best tempered steel.

NEW PROCESS FOR WORKING STEEL.—Negotiations are in progress for the formation of a company to work a new process of seamless pressed steel, invented by Messrs. Heelingham and Bywater, engineers in the employ of Mr. Samson Fox of Leeds, Eng.

GERMAN MAKERS assert that their steel engraving tools possess the hardness of a diamond. The method employed is said to be to heat the tools to a white heat, plunge repeatedly into sealing wax until cold, and then just touch with oil of turpentine.

The courts decide that the original Lick trustees must build and put into operation the Lick School of Mechanic Arts, for which \$540,000 was left by James Lick.

SCIENTIFIC PROGRESS.

Extraction of Oxygen from the Atmosphere.

One of the industries now followed in London, and certainly a novel and remarkable one, even for this age, is that of separating and storing oxygen from the atmosphere. This interesting process has a unique application in the maturing of spirits and improving the quality of beer, and, though this is far from being the only application which is made of pure oxygen, it is one which, for various reasons, has excited most attention, especially in that department of trade, on account of its financial bearings. It is claimed that the oxygen, in its contact with spirits, actually accomplishes in a few days what, if left to the natural and usual process, requires a period of from three to five years. The oxygen, it is said, gets rid of the fuel oil quickly, thus relieving the liquid of its most injurious property, and not only this, but a maturer effect is also produced on beer by admixture with oxygen.

About thirty years ago Boussingault discovered that the monoxide of barium, at a temperature of 1000 deg. F., would readily absorb oxygen from the atmosphere, forming a dioxide, and that at the higher temperature of 1700 deg. it would be given off again. The only obstacle to the use of barium as an economical means of obtaining oxygen arose from the fact that the barium took soon lost its power of recovery. To the brothers Brin the world is indebted for the ability to overcome this difficulty, and within the last two years the Brin Oxygen Co., of London, has become a reliable and commercial success. Barium oxide is a mineral substance closely resembling lime in its properties, and occurs most commonly in lead districts, as a sulphate or carbonate. A lump of barium monoxide might readily be taken for pumice stone, but in action it is very different. When placed in water it slacks with greater rapidity than lime, and gives off much more heat.

Extermination of American Animals.

We gave last week an article under the above head, showing that a large number of American animals are rapidly disappearing before "the man with the gun," and from inhuman fashions that now prevail for dress ornamentation. A writer in a late number of the *Chautauquan* tells us how this work of destruction may be curtailed. He suggests that a tax be levied upon all persons found with fresh skins in their possession; which we suggest be carried further, and that the humane societies excite popular interest in favor of instituting a law prohibiting skin or fur dealing; also the dealing in and wearing of millinery birds, to which may be added the innumerable uses to which portions of animals and birds are put for decorative purposes, and sold so cheaply as to still further show the low estimate placed on life and blood.

The influence for evil increases with the cheapening of animal wares, as we readily see, for they are then brought within the reach of all, carrying with them the demoralizing and benumbing influence associated with the killing of these—God's creatures.

When we look through our wardrobes we are bewildered as to what will take the place of the portions of animals with which we have bepatched ourselves; but more appalled are we in solving the dizzy problem of home decorations, where the evidences of wholesale slaughter of the unoffending creatures stare us in the face at every turn. Even the bible is clothed in the skin of an animal. Verily, we can not judge of contents by exteriors; and I doubt not that if the bible could speak it would tell us how hateful and uncomfortable it feels in other's clothes. Do I startle you into discomfort? Well, misery likes company.

"There is no royal road to knowledge." While getting our eyes open has enabled us to see this mire of carnage through which we wade, it also enables us to see the lighted path beyond and the upward direction of our intelligence to devising means for supplying substitutes for the great variety of birds and animals which have been forced to find a final resting place piecemeal among the civilized. (?)

ABOUT FISH AS FOOD.—Fish, especially salmon in tins, are something colored with annatto. As the eye and the palate have a very intimate relation, it is frequently the case that vegetable or other harmless coloring matter can be advantageously used in food preparations, just as it is in the manufacture of confectionery. It is better, however, to eat our food with the color which nature gives it. There is a very interesting fact connected with the drum-fish, which was recently reported to the Philadelphia Academy of Sciences by Dr. Leidy, of that city. He said that "during a visit to Charleston, S. C., before the late war, there were served at an evening entertainment, among other viands, some nicely browned slices of the drum fish, *pogonias chromis*. A friend, informing him that some proportions were more gelatinous and delicate than others, had helped him to what he supposed was one of such. On cutting into it he had observed embedded in the flesh a soft mass, which appeared of enigmatical character. The following day he procured

from the market a drum-fish, on dissection of which he found embedded in the tail several egg-shaped masses, about three inches long and less than an inch thick, which proved to be a large coiled worm an *acanthorhynchus reptans*. This it was that gave delicacy to the dainty, and in this instance the parasite seemed to enhance the excellence of the food."

THE CLOUDS AT NIGHT.—The observations made during night ascensions, or those which were continued into the night, in temperatures at different heights, gave results different from the theories previously held on the subject. An increase of the temperature with the night was noticed after sunset. The rate of decline of temperature with elevation, when near the earth, was subject to variation as the sky was clear or cloudy. From an elevation of three miles cirrus clouds were seen apparently as far above the observers as they seem when viewed from the earth, and that under such conditions that it was hard to believe their presence was due to moisture. The audibility of sounds from the earth depended considerably on the amount of moisture in the atmosphere. The noise of a railway train could be heard in clouds at four miles high, but not when the clouds were far below. The discharge of a gun was heard 10,000 feet; the barking of a dog at two miles, but the shouting of a multitude at not more than 400 feet. Many differences in the results of observations were supposed to depend upon atmospheric conditions, while these vary with the time of day and the season of the year, so that a great many observations would be required to determine the true laws. Having followed up one of the observations recorded above with a captive balloon, and by other means, Mr. Glaisher declared to the Meteorological Society in 1870 that the theory that the temperature is always lower at higher elevations is not true.

A SUBSTITUTE FOR OAK BARK IN TANNING.—In a recent United States consular report, Mr. Merry describes "a vegetable product which will become a ready and perfect substitute for the rapidly vanishing oak of our own country." This is the Australian wattle, which belongs to the widespread family of acacias, and which is cultivated extensively in New South Wales and Victoria, where it lends a charm to the scenery both by its fragrant blossoms and its exquisite foliage. The two varieties most cultivated are the black and the broad-leaved wattle, and both can be grown in an exceedingly dry climate and a poor soil. The black wattle produces a large amount of tannic acid. Its value for tanning will be understood when it is mentioned that hides can be readily tanned in a bath of liquor made from the black wattle in 47 days, whereas, in liquor made from the bark of the Santa Cruz oak, the best known in the Pacific States, the time required is 75 to 80 days. The black wattle contains 30 to 35 per cent of tannic acid, the broad-leaved wattle 26 to 28, Santa Cruz 16 to 18, and other kinds of oak less still. Although the broad-leaved wattle has less acid, it has certain advantages over the black variety. It is a larger and handsomer tree, and can withstand a greater amount of frost.

THE CAUSE OF SUBWAY EXPLOSIONS.—Numerous explosions from underground electric wires all over the world have generally been attributed to gas in the mains or the decaying of organic or vegetable matter, and in either case explosions being effected by the arcs formed in conduits by imperfect insulation and the water surrounding the electric wires. It is well known that the detonation of explosives in many instances depends on the means used in igniting; an explosion caused by a spark produced by gunpowder or a flame. Prof. George Forbes, F. R. S., has made some pertinent suggestions as to whether these explosions have not been due to oxygen and hydrogen formed by the decomposition of water which is generally around the wires, giving opportunity for arcs to be formed. Hydrogen and oxygen, in the gaseous state, form one of the highest explosives known.

INGENIOUS CLOCK.—Aside from being a regular timepiece and daily calendar, it is also provided with a system of keys making a double circuit around the outside of the clock, the first one to denote the hour and minute, and the other the day of the month. The object is to furnish thereby a regulator for business appointments. For instance, if a man had an appointment at 9:10 o'clock in the morning, he would turn the indicator to that time as well as another to Dec. 1. At the minute exactly that morning an alarm would be turned in, and would continue to ring until stopped. The clock is the first of its kind in America, and has been viewed with considerable interest by the jewelry trade.

THE PHONOGRAPH AS A TEACHER.—The phonograph is expected to prove a valuable aid in the study of languages. The pupil can take home a piece of tin-foil on which is recorded his teacher's correct accent, and practice with it in his own room as much as he pleases.

PROF. ORTON concludes that the natural gas supply of Ohio and Indiana is not only not inexhaustible, but that it will probably be exhausted in nine years.

GOOD HEALTH.

Health of the State.

The report of the State Board of Health for February gives encouragement of an improved condition of the general state of health throughout the State since the January report. Returns have been received from 103 localities having an estimated population of 822,950, showing a decadence at the rate of 17.28 per annum, while the returns for January gave an annual death rate of 20.64. Diseases of the respiratory organs, however, still occupy the most prominent place among the causes of death.

Consumption heads the list with 249 deaths, a decrease of 21 from January.

Pneumonia also presents the large mortality of 160 deaths. Nevertheless it is a decrease of 68 from last report.

Bronchitis is credited with 33 decedents. This is also a reduction of 19 from last report, although it is much in excess of the usual mortality recorded from this disease. Congestion of the lungs was fatal to 12 persons, about half the mortality of previous month. Whooping-cough caused six deaths, which indicates an increase in the disease. Diphtheria and croup, collectively, were fatal in 18 instances, a marked decrease from fatality in January, when 40 deaths were registered from these diseases. Diarrhea and dysentery caused but five deaths, an unusually small rate. Cancer, as usual, has caused a large proportion of deaths, 22.

The reports from localities generally throughout the State indicated very well marked subside in the frequency and fatality of diseases of respiratory organs. The notes of a number of correspondents convey the impression that in a majority of the districts heard from, the condition of the public health was much more satisfactory than was to be expected, considering the extremely inclement weather that prevailed throughout the month. The decrease in the prevalence of disorders of the bowels was quite noticeable, especially cholera infantum, which is hardly mentioned.

The absence from our reports of typhoid fever as a prevailing disease is remarkable, and in some degree confirmatory of the observations of authorities upon this subject, that a copious and continuous rainfall so flushes and washes out the impurities of the soil and the receptacles of filth that typhoid fever becomes perceptibly lessened in its frequency, if not entirely absent, from localities in which it before was prevalent.

Care is being taken to prevent the smallpox from crossing the border from Las Vegas, Mexico, where it has been for some time prevalent. Recommendation is made that care should be taken in the way of general vaccination, especially in the schools, to prevent the possibility of its again becoming prevalent in this State.

Influenza is rapidly abating; although mentioned in nearly all of our reports as still present in the State, it is characterized by its mild form and general absence of fatality. Probably the next report will convey the intelligence of its total disappearance.

The Adulteration of Confectionery.

Much has been said of late in regard to the adulteration of confectionery. One of our city dailies recently said: "The adulteration of candy is a topic which should be taken up by the State governments and by Congress. Statistics show that every year witnesses a spread of the practice which cannot but result in serious injury to the health of children. Terra alba, or white earth, is used exclusively for adulterating candies, yet no less than 6000 tons of this substance were recently imported through New York. Lozenges made entirely of this earth are dipped in syrups flavored with peppermint and other essences and then sold as genuine sugar lozenges. When it is known that terra alba is a mineral insoluble by the gastric juices, the extent of the evil of this adulteration may be understood. It means grave danger of incurable disease to thousands of young children."

A correspondent of the *Scientific American*, in allusion to the above, which also appeared in that journal, says that the importation of the 6000 tons of terra alba occurred some five or six years ago, before the organization of the National Confectioners' Association. It seems to be admitted that terra alba and perhaps other adulterations were used to some extent previous to the organization of that association; but it is denied that adulterations have been used since. One of the leading objects of the association is to prevent such frauds. As an evidence of this, the correspondent above alluded to says that the association "offers a reward of \$100 for evidence that will enable it to convict any person of adulterating confectionery with poisonous or injurious substances, the association assuming all the cost of prosecuting."

In addition to the above, the correspondent, who is the editor of the *New York Confectioner*, offers to duplicate the reward himself. The above assurance that such adulterations have practically ceased, through the efforts of the leading manufacturers themselves, should be very gratifying to all.

MADE IT PAY.—It is said that Dr. Knorr of Germany, the discoverer of antipyrine, the

great grip remedy, has made considerably over a million of dollars by the winter's epidemic. The medicine sells at \$1.40 an ounce, and Dr. Knorr gets a royalty of about 60 cents on every ounce sold.

DANDRUFF.—The application of chloral hydrate in solution of five grains to the ounce of water is said to clear the head of dandruff and prevent falling of the hair from the latter cause.

USEFUL INFORMATION.

A NEW AND CHEAP BINDING TWINE.—The need always brings the inventor. The high cost of binding twine, brought about by the corner made by speculators in twine, has resulted in the invention of a practical and cheap substitute, which is practically out of reach of speculators. An Iowa inventor has come to the front with this much needed substitute. The new twine is made of dried grass. He has also invented a machine for making it. When in Chicago a few days since he exhibited a large bundle of such twine, the thread of which is about one-eighth inch diameter, and as flexible and as easily handled as the same size of hemp twine. It will sustain 200 pounds of tension. This twine may be made of upland prairie grass, though the best is of coarse marsh grass. The machine for making it is simple, and can be constructed so as to be within the reach of every farmer. A boy can make about 800 yards of twine an hour. As compared with the present twines used for binding it costs much less to make and from 5 to 7 cents an acre will be the cost of its use. The twine consists of this dried grass or hay twisted tightly and firmly held together by cotton thread. It has also been woven into bagging for shipping cotton. For this purpose it has proved admirable, being strong and very durable. It is about one-third the cost of jute, and is said to be much more serviceable.

FAILURE OF "SMOKELESS POWDER."—The French have succeeded in making a powder that is nearly smokeless. The manufacture is a secret owned by the Government. It is considered of great value in war, and other European nations have produced something of a similar nature which is even more smokeless than the French article. Italy built a factory to manufacture it in the interest of the Triple Alliance of Germany, England and Italy. On trial it has proven a success so long as the powder is kept warm; but recently when the cartridges were tried in cold weather they most unexpectedly failed to explode. Repeated trials have shown that the powder has no value except in summer weather. Hence, it is claimed that the invention is a failure. Great efforts have been made to secure a cartridge of the French make for analysis, but hitherto without success. Every cartridge is more carefully guarded than a mint of gold. Two French soldiers are now serving life sentences in prison for trying to steal a single cartridge to sell to Germany. A cartridge is a little thing and doesn't cost much, but the secret those cartridges contain may mean victory for France some day, and the French Government will go to almost any extreme to keep rival nations from knowing it.

JAPANESE CLOCKS.—The Dublin Science and Art Department has recently purchased several Japanese clocks, which differ in many respects, but all record time without the usual hand rotating about an axis. The scale of time is arranged as on a thermometer, and a pointer attached to a weight projects from a slit in the scale, and, travelling down it, thus points out the time. We understand that such clocks were seen in Japan 30 years ago, but that they are now generally superseded by clocks of European pattern.

A SILKEN FIBER FROM THE BANANA PLANT.—Attention is being again directed to the utilizing of the banana. From the stalk and leaf of this plant, it is stated, a beautiful silken fiber can be obtained, which, when manufactured into dress goods, closely resembles Irish poplin. When suitable machinery for decorating it is found, it is thought this fiber will command large commercial attention for the manufacture of textile goods, as well as for paper and other purposes.

PETROLEUM BRICKS.—The French professor of chemistry, De Millefleurs, recently exhibited before a meeting of Parisian scientists several bricks of petroleum, which he has discovered how to solidify by an original process. The petroleum bricks were hard enough to be handled without inconvenience, yet soft enough to be cut with a stout knife. They burned slowly when touched with a match. Millefleurs says they are non-explosive and inexpensive.

THE GOOSE QUILL VS. THE STEEL PEN.—In the English Patent Office, where of all places in the world some knowledge of inventions should exist, the steel pen is unknown. The old goose quill is the most recent writing implement in existence, so far as can be gathered by a visit to the official library, and as many a quill is as useful for legible writing as the end of a burnt match, some of the notes taken there much resemble the track of a snail.

ELECTRICITY.

Progress of Electrical Industry.

The great advance in the application of electricity to useful purposes during the last decade is one of the marvels of modern industrial progress. Until quite recently very little attention was paid to mechanical engineering as applied to electricity. The construction of electrical instruments and machines and their erection and use were in the hands of persons who knew but little about electricity. At present, however, the best dynamos and other electrical appliances are made by experienced electrical and mechanical engineers. Observation shows that the electrical industries of to-day are more and more demanding the services of both skillful mechanical engineers and well educated electricians.

Twenty, even 15 years ago, very little was known about exact mechanical calculations concerning electrical phenomena. It was scarcely thought that there was a science of electricity apart from its mere natural history. Even up to ten years ago, aside from the electric telegraph, very little was known in regard to electricity except what may be called the production of electric tricks. The researches of Cavendish, Faraday and Joule and the valuable papers of Sir William Thompson were simply buried in scientific journals, and but little attempt had been made to apply them to mechanical progress or the useful arts of life.

It is only within the decade just passed that the electrician has become also a mechanical engineer and sought useful appliances for this wonderful and mysterious agent. Now the hand of the electrical engineer may be seen everywhere. He has wandered away from his telegraph poles and may be seen in the shop, in the factory, on the railroad, on the farm, in the mine, in the dwelling and in many of the useful arts, where he is applying his genius to modify the handiwork of man and in devising improved means to useful ends in almost every industrial operation.

To-day the electrical engineer can design a thing with an exact knowledge of what it will do. His calculations are as close and reliable as those of the mechanical engineer. The world has entered upon a new and most important engineering science, the possibilities of which are almost inconceivable. This new mechanical science has made greater progress within the last ten or twelve years than was reached by steam in any 100 years of its advance. It is just now, in this country especially, the all-absorbing study of an increasing number of mechanics and electricians, which has already become a vast multitude, who are constantly employing their inventive powers in contriving new devices and studying with all their energy to acquire a still clearer knowledge of the science and application of electricity. Our people, our government, and even the proudest European diplomats and potentates, are giving honor and applause to the experimenters and inventors who lead in this great work of modern progress. While we would not take a single leaf from the well earned wreaths of the distinguished scientists whose investigations have made this work possible, we would give the highest honor to the eminent mechanicians who have made a practical application to the use of man of the scientific facts which have been placed before the world by the men of science.

We would say, with a late writer on "The Future of Electricity," that "We who are unfortunate enough to have less than half of our probable time of life to look ahead to, are greatly pleased with the rapidity of electrical development, as it assures us the probability of seeing many wonderful advances to be made in the growth of this science, both pure and applied. But we realize that the inventions and discoveries of the near future are likely to be closely allied to the accomplishments of the present."

"The development of new fields is to be left to succeeding generations. We can hardly hope within the present generation to see the successful production of electricity in large quantities for commercial use direct from the crude material instead of the present expensive method of passing the energy through the boiler and steam engine. The full understanding of the production of light by the fire-fly and the applications in that direction are certainly too far ahead to afford us, for the present, more than a mere ray of hope of anything more than an imaginary picture of what in time will surely come to pass."

ELECTRIC SHOOTING.—The French minister of war is making some experiments in electric shooting, and intends to arrange so that he can discharge his guns upon the enemy from unexpected places by means of an electric current. By placing a battery on a hill, in a fort, or at the entrance of a defile, it would be possible to shoot from a distance or automatically discharge the artillery at any precise point of the line of defense.

A NOVEL APPLICATION OF ELECTRICITY.—An enterprising restaurant proprietor has made a novel application of electricity, namely, to the lighting of cigars. On the top of the case in which the cigars are kept stands a little oblong machine. It has the usual sockets containing methylated spirits and torches, and on its sum-

mit is a little square projection. To light his cigar the smoker takes one of these torches, sees that it is well soaked in the spirits, and touches it sharply against the projection, which instantly emits a volley of sparks and sets the end of the torch ablaze. The current comes from electric wires up above, from which a couple of light wires run down to the quaint little instrument.

CONGRESSIONAL INVESTIGATION.—Mr. A. J. De Camp of Philadelphia has circulated a petition asking Congress to appropriate the small sum of \$50,000 for the purpose of investigating electric lighting, not only with a view of ascertaining the figures that represent its growth, but specially with the object of inquiring into the casualties that have resulted from the use of electric currents, and as compared with casualties from other agents employed for similar purposes. This is a timely appeal.

THE BUILDER.

A FIRST PRINCIPLE OF BRIDGE BUILDING.—If one plank would hold up 100 pounds on the center, then the two planks, placed side by side, would hold up 200 pounds, while placing the planks one on top of the other end nailing them firmly together they would hold up 400 pounds. In this way we see that, in order to increase the strength of the bridge, or beam, faster than we increase the amount of material, the increased amount of material should go into the depth of the beam and not into the width of it. This is one of the first principles in the resistance of material, that the strength of a beam varies directly as the width—that is, if we make the beam twice as wide, it will hold twice as much; and that the strength varies as the square of the depth—that is, if we make it twice as deep it will hold up four times as much. If we make it three times as deep, it will hold up nine times as much of a load. So it can readily be understood that in order to increase the strength of the bridge or beam without increasing the material in the same proportion, the increased amount of material should be put into the depth and not into the width.—*Ex.*

FRENCH PROCESS FOR HARDENING PLASTER.—The following process comes from France for hardening plaster, so that it may be used for flooring, as wood and tile are at present: About six parts of good quality plaster are intimately mixed with one part of freshly-slacked white lime finely sifted. This mixture is then laid down as quickly as possible, care being taken that the trowel is not used on it for too long a time. The floor should then be allowed to become very dry, and afterward be thoroughly saturated with sulphate of iron or zinc—the iron giving the strongest surface, the resistance to breaking being 20 times the strength of ordinary plaster. With sulphate of zinc the floor remains white, but when iron is used it becomes the color of rusted iron; but if linseed oil, boiled with litharge, be applied to the surface, it becomes of a beautiful mahogany color. Especially is this the case if a coat of copal varnish be added.

STEEL HOUSES NEXT.—A very favorable account is given in the French papers of the system of building houses of steel plates, introduced some time ago by M. Danly, manager of the Societe des Forges de Chatellain, and who has set forth its various advantages in an interesting and plausible manner, attracting considerable attention. M. Danly has satisfactorily ascertained that corrugated sheets of no more than a millimeter in thickness, are sufficiently strong for building houses several stories high, and the material used allows of quite a variety of architectural ornamentation. The plates thus employed are of the finest quality, and, as they are galvanized after they have been cut to the sizes and shapes required, no portion is left exposed to the atmosphere. It is asserted that houses constructed in this manner are very sanitary, and that the necessary ventilating and heating arrangements can be readily carried out.

A SPANISH FIREPROOF FLOOR.—A new system of fireproof floor construction has recently been introduced into this country from Spain, where it has been in use a number of years. Its general features are the use to form the arches of a hard, well burned clay tile laid flat with the several courses breaking joints. The composition of the mortar is a secret, but it adheres so closely to the tile itself, and is so firm and solid when it has fully hardened, that its strength is about equal to that of the tile. The arches are either cylindrical or domed, and in either case weigh but little more than half the weight of brick arches as ordinarily constructed. The principal saving, however, is the reduced number of beams used, owing to the considerably greater span which may be made with the tile arch.

A GOOD IDEA.—The Boston *Transcript* concludes that it would be a good thing if the names of architects were conspicuously displayed on buildings they had planned, as "it would save so much time to persons who purpose building, in making up a list of architects to be avoided." It isn't a bad idea.



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Passing Events.

The trouble between the foundrymen and the molders in San Francisco still continues. The men brought from the East joined the strikers soon after their arrival, but others are on the way. The foundrymen are convinced by experience that they cannot continue to operate their shops under the conditions demanded by the molders. The strike may last for months to come.

Many of the mines in this State have all they can do at present to handle the seepage water and are doing little toward ore extraction. The ground is soaked full of water which flows into the mines, entailing great expense for pumping.

The storm of this week was felt all over the central and northern portions of the State, and more snow has fallen in the Sierras, materially adding to an already great accumulation.

The developments in the suit concerning the Mulatos mine, referred to elsewhere, will be looked for with interest by mining men, as the "operators" are well known throughout the State.

The Mulatos Mine.

In September last the Mulatos mine in Sonora, Mexico, was sold to a syndicate of London and San Francisco capitalists by the Agnayo Bros., the Mexican owners, Alvinza Hayward of this city acting for the purchasers, he being one of them. The price paid was \$1,575,000, of which \$875,000 was in cash. This week an action was commenced by the Oro Grande Co. (the incorporated name) for a rescission of the contract of sale, the plaintiffs desiring to return the property and regain their money. The plaintiffs allege in their complaint that the samples of ore given by the owners or their agents to the purchasers had been tampered with, or, in the familiar phrase of the miner, had been "salted," and that they had in consequence been swindled. The complaint also prays for an injunction restraining the defendants from disposing of any of the money or securities turned over to them.

It is stated that Alexis Janin and D. B. Gillette reported on the mine, but the samples were "salted" on them. Mr. Janin, in a card, explains that he examined the mine for other parties two years ago and reported the average yield as \$5 per ton, and advised sampling by millrun and not assays. Mr. Janin's report was to Smith and De Crano and not to Hayward and Hobart, and his principals declined to purchase, since which time he has had nothing to do with the matter.

Mr. Gillette was well equipped to sample and assay, and it is hardly probable that any "salting" would have deceived him, either.

It seems the Agnayo Bros. left a good deal of their money here with their agent, W. Loiza, which seems strange if they had perpetrated a swindle. In fact there have been several attempts to sell this Mulatos mine, and there are several expert reports extant, so its value ought to be as well known as any mine in Mexico. That Messrs. Hayward and Hobart, two of the most experienced mine operators here, should have been swindled on a mining proposition, is very remarkable. Their man Montgomery, who is at the mine now, did not go before they purchased, neither did either of the gentlemen named visit the mine in person, as is their custom when making such a purchase.

The prominence of the purchasers and the experts, the sums paid and the notoriety of the mine, make this a very interesting case, and the legal developments will be awaited with interest. Without knowing any of the details, the opinion is expressed by some that perhaps the purchasers expected to make a "London deal," in which they failed, and now want to drop a bad bargain.

Iron Abroad and at the East.

Since the commencement of the year there has been quite a fall in the price of iron in England and also at the East. To those who had closely watched the advance, the decline has been no surprise; the only surprise was that prices abroad went as high as they did. The causes which led to advance were largely reduced stocks, many furnaces out of blast, and an enlarged demand for iron ships. This naturally brought into the field speculators, who ran up Scotch warrants to unwarrantable figures, which had a direct bearing on pig iron, for large consumers rushed into the market to anticipate their wants, and this buying precipitated the advances. The decline of the market is from natural causes, and briefly stated are a close money market, consumers holding off and shipowners not placing any further orders, preferring to await a lower range of values for iron, which they thought inevitable owing to more furnaces having gone into blast. With more furnaces in blast the stock of iron would soon gain on the consumption.

In the Eastern States the market moved up in sympathy with the advance abroad, but with better prices more furnaces went into blast. On June 1, 1889, there were 283 furnaces in blast, with a weekly capacity of 137,119 tons, and on March 1, 1890, there were 343 furnaces in blast, having a weekly capacity of 180,991 tons. The furnaces in blast have not only increased in numbers but more are to follow. In the number of new furnaces blown in, the Southern States are largely represented, particularly West Virginia, Alabama, and Tennessee.

With an enlarged output, lower prices are a

natural result, yet this will be offset by an enlarged demand, for present advices indicate that the consumption in this country this year will be larger than for any preceding year. This is based on the growing requirements for more railroads in the Southern and Southwestern States, the building of war vessels and also extensive improvements in many sections, which will require large quantities of iron.

The Roney Mechanical Stoker.

The Roney mechanical stoker (shown in the cut as applied to a Babcock and Wilcox boiler) is a simple apparatus, which, when attached to steam boilers, receives the fuel in bulk, and thereafter, without further handling, feeds it continuously and at any desired rate to the furnace; burns the combustible portion and deposits the ash and cinder in the ash-pit ready for removal.

The fuel to be burned is dumped into the hopper on the boiler-front. In small plants, it may be shoveled in by hand. In large plants, it is usually handled direct from the car to the hopper by elevators and conveyors. Set in the lower part of the hopper is a pusher to which is attached by a flexible connection the feed-plate forming the bottom of the hopper. The pusher, by a vibratory motion, carrying with it the feed-plate, gradually forces the fuel on to the grates over the dead plate. These grates consist of horizontal flat-surfaced bars running from side to side of the furnace, carried on inclined side-bearers extending from the throat of the hopper to the rear and bottom of the ash-pit. The grates, therefore, in their normal condition form a series of steps, on to the top step of which coal is fed from the dead plate. These steps at the inclination given would, however, prevent the free descent of the coal. But each bar rests in a concave seat in the bearer and is capable of a rocking motion through an adjustable angle. All the grate-bars are coupled together by a rocker-bar, the notches of which engage with a lug on the lower rib of each grate-bar, pin connections being made with two of the grate-bars only, for the purpose of holding the rocker-bar in position. A variable back-and-forth motion being given to the rocker-bar, through a connecting rod by a device to be hereafter described, the grate-bars necessarily rock in unison, now forming a series of steps and now approximating to an inclined plane with the grates partly overlapping like the shingles on a roof.

Assuming the grates to be covered by a bed of coal, and fresh fuel being fed in at the top, it is obvious that when the grates rock forward the fire will tend to work down in a body. But before the coal can move too far, the bars rock back to the stepped position, checking the downward motion, breaking up the cake thoroughly over the whole surface and admitting a free volume of air through the fire. The rocking motion is slow, being from seven to ten strokes per minute, according to the grade of the coal. This alternate starting and checking motion being continuous, keeps the fire constantly stirred and broken up from underneath, and finally lands the cinder and ash on the dumping-grate below. By releasing the dumping-rod, the dumping-grate tilts forward, throwing the cinder into the ash-pit, after which it is again closed ready for further operation. The dumping-grate is made in two parts, so that each half can be dumped separately. The operation of the stoker, therefore, consists of a slow but continuous feed, a constant stirring of the fire, and an automatic rejection of the cinder, all performed without opening the fire doors.

The actuating mechanism is simple. All motion is taken from one driving shaft. In a single stoker this shaft may either be driven through a worm gear from a small engine attached to the boiler front and consuming a hardly measurable fraction of a horse-power, or it may be driven by a link belt from any convenient point of the nearest shaft. In large batteries of boilers the driving shaft is extended across all the boiler fronts, delivering power to each stoker, and with the elevators and conveyors is driven by a small independent engine. The largest stoker can easily be turned over by hand, indicating the nominal power consumed. The worm gear shaft carries a disc and wrist pin from which a link couples to the agitator. Through the eye of the agi-

tator passes a stud screwed into the pusher, on which stud is a feed-wheel by which the stroke of the pusher and consequently the amount of feed is regulated. The agitator having a fixed stroke, it is apparent that if the feed-wheel is run down against it the pusher will be given its full traverse and the greatest feed. If run back to clear the travel of the agitator, the pusher will of course have no motion and the feed will stop. Between these extremes any desired rate of feed can be given.

In like manner the rock of the grate-bars can be adjusted between any limiting angles, and over a range of motion from no movement to full throw, by means of the sheath nut and jam nuts on the connecting rod. By these two simple adjustments within the comprehension of the ordinary helper, the whole action of the stoker is controlled and the fires forced, checked or banked at will. There are poker doors in the front on each side of the hopper, through which the whole grate can be seen and the condition of the cinder on the dumping-grate determined. A gate controlled by a couple of band-wheels shuts off the hopper from the furnace altogether when desired.

This is a very simple device for so important a purpose. The motion is very slow, and any bar can be picked and replaced easier than in the ordinary flat grate. Although the cut shows the mechanical stoker applied to a Babcock and Wilcox boiler, it can be applied to those of any kind. A number of these devices have been put in use here in San Francisco of late by the California Engineering Co. of room 103 Pbelan building.

The Foundry Strike.

The main features of the foundry strike this week have been the arrival of a special train with molders from the East, and the subsequent desertion of most of them from the foundries where they were placed. Fifty-four men started from Philadelphia, but some deserted on the way and 46 arrived and were taken to the foundries where they were to work. Arrangements had been made for the men to eat and sleep at the works, so they should not be intimidated by the striking molders. Policemen and guards have been on duty at the foundries to prevent any disorder, but no violence has been attempted. Only six of the imported men are now at work, the others having violated their contracts and joined the strikers. A number more men are on the way, however, being brought here by the Foundrymen's Association, who had anticipated that many would desert. If they keep on bringing men, they will flood the town with molders that the Molders' Union must support, send back or permit to work. A number of molding machines have also been sent for with which a certain class of work may be done.

Contracts have been let East for about \$200,000 worth of castings, which will be finished here to fill standing contracts. All this is a direct loss to San Francisco mechanics.

The manufacturers seem a unit in insisting that they must win this contest if they intend to continue business; otherwise Eastern competition will close them out. If they cannot secure molders here or in the East who are willing to work, they must discharge the pattern-makers, boiler-makers, machinists, helpers and apprentices, and go out of business. The Molders' Union is a powerful organization and has practically dictated terms for years. The manufacturers have chafed over the situation, seeing business go away from their doors to cheaper centers of labor, but have been unable to prevent it. When it came to a limitation of work in addition to high wages, the foundrymen could stand it no longer. Now that the men have struck, the long-expected fight has commenced and may last for months. Two or three more of the smaller foundries have closed down and discharged their men. The large shops are all working under difficulties, but are all united in their action, and fully expect to win in the end.

The Giroux Amalgamator Co. ask from Baker City, Oregon, a subsidy of \$25,000 for the erection of sampling works and machine shops at that place. The sum of \$17,000 has been subscribed, and the whole amount assured. Baker City is a very lively mining center in these days, and bids fair to be a much livelier one as the rich mines which surround it are developed.

Artesian Wells.

As mentioned in last week's PRESS, the people of Oakland, dissatisfied with the water furnished by the local company, are considering the question of artesian supply for domestic purposes. For as large a city as Oakland, this is an important engineering problem, and one requiring careful investigation. It will not do to bore wells at haphazard wherever is most convenient, nor must any specified area or section be overtaxed for supply. Competent engineers should study up the whole question in detail and report before any active steps toward general work are taken.

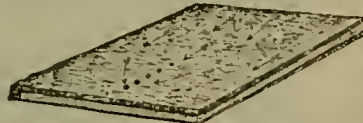
It is, however, by no means unreasonable to suppose that a domestic supply can be obtained. There are already many such wells in Oakland and other parts of Alameda county. They are not flowing wells, but the water comes up very close to the surface. Pipe connections under ground below the water level in the wells would cause a steady flow to any given point, whence the water could be lifted to a suitable elevation for necessary progress in the dwellings. In the city of Memphis tunnels connect the wells with common snmps or cisterns, so that the water flows to these points and is there pumped to required heights.

By thus tapping the wells below the height of natural rise, the well becomes a flowing one, the amount depending, of course, on the location and richness of the artesian bed.

Riverside, in this State, has its water supply for domestic purposes entirely from artesian wells, a separate supply being brought in for irrigation. There, the wells flow above the surface and the water is conducted to an aerating

the PRESS we had occasion to refer to this subject and here reproduce some sketches bearing on this point.

Where there must be several wells, then distribution is a matter of consequence. The normal direction of flow, when once it is set up, by virtue of the opening of an avenue of discharge, is along a line drawn from the outcropping edge of the bed down its slope to the wells. Now it is clear that if several wells are



FIGS. 1 AND 2.—Tabular Sections of Strata, Showing Disadvantageous Arrangements of Wells.



FIGS. 3 AND 4.—Tabular Sections of Strata, Showing Advantageous Arrangements of Wells.

arranged along this line, the first one will be better placed than those which stand below it. These will be, indeed, measurably supplied by lateral flow under the law of equal pressure, but less direct and freely. If the wells are disposed in a cluster, those on the exterior will partially cut off the supply of the interior wells. A more fortunate disposition than either of these would be an arrangement in a line at right angles to the direction of flow.

A still more advantageous arrangement, enh-

tical considerations limit their dispersion.

Figs. 1 and 2 exhibit tabular sections of strata, showing disadvantageous arrangement of wells. Figs. 3 and 4 are tabular sections, showing proper and advantageous arrangement of wells.

In the MINING AND SCIENTIFIC PRESS of Jan. 26th and Feb. 9th, 1889, were published articles on "The Requisite and Qualifying Conditions of Artesian Wells." Nov. 9th, 16th and 23rd,

we presented articles by C. E. Grunsky, C. E., on "Artesian Wells in California." In 1878 and 1879 we also published a series of articles referring in detail to artesian wells in various parts of this State. In all of these are very many interesting and practical facts which will be found useful to those considering the subject of artesian wells.

THE Kansas City smelting men are arguing with the Congressional Committee in favor of

The Colorado Canyon.

(Continued from page 197.)

tudes which had added enormity to coarseness, now become replete with strength and majesty.

The observer who visits the commanding point with the expectation of experiencing forthwith a rapturous ecstasy will be disappointed, for he will be simply bewildered.

But those who have long and carefully studied this grand canyon of the Colorado river pronounce it by far the most sublime of all earthly spectacles. If its sublimity consisted only in its dimensions, it would be sufficiently set forth in a single sentence. It is more than 200 miles long, from 5 to 12 miles wide, and from 5000 to 6000 feet deep. The common notion of a canyon is a deep, narrow gash in the earth with nearly vertical walls. There are hundreds of chasms in the Colorado-river country which answer this description. Many are frightfully deep and 50 to 100 miles long. Some are exceedingly narrow where the overhanging walls shut out the sky. Yet the chasm of the Colorado and the trenches in its rocks, which answer to the ordinary description of a canyon, are in marked contrast.

The engraving on the first page, which is a reproduction on a smaller scale, of one of the plates in Dutton's U. S. Geological Survey monograph on the Grand Canyon, shows a panorama from Point Sublime. From the end of this point the distance across the chasm to the nearest point on the summit on the opposite wall is about seven miles. This does not, however, fairly express the width of the chasm, for both walls are recessed by wide amphitheaters setting far back into the platform of the country, and the promontories are comparatively narrow strips between them. A more correct statement of the general width would be from 11 to 12 miles. This must dispose at once of the idea that the chasm is a narrow gorge of immense depth and simple form.

The length of the canyon revealed clearly and in detail at Point Sublime is about 25 miles in each direction. The space under immediate view from our standpoint, 50 miles long and 10 to 12 wide, is thronged with a great multitude of objects, vast in size, majestic in form, and infinite in detail. The cut only conveys a faint impression of the magnitude of the surroundings.

In a Drift Mine.

We give on this page a view in the Red Point drift mine, Placer county. The photograph was taken by W. C. Ralston, of the Hogback mine, with a flash light. The view is at the gravel-breast, about 3000 feet from the mouth of the tunnel, and shows the height of the auriferous gravel at that point. The gravel varies from three to seven feet in height. It is rather difficult to get photographs of this sort underground, but Mr. Ralston succeeded pretty well in this instance. It is the first time we have been able to obtain underground pictures in the drift mines, though many have been made in the quartz mines. We shall shortly reproduce other photographs of the drift-mining section of Placer county.

THE ECLIPSE MINE.—The Eclipse mine at Ophir, Placer county, is an old location but has laid idle some years for lack of capital for machinery. Recently J. B. Patterson, a prominent resident of Placer county, obtained an option on the property, and succeeded in placing it with a strong Eastern company and securing the necessary capital for its development. We are told that the main ledge is 20 feet wide, the ore running \$18 in free gold, exclusive of sulphurets. There is ample water-power, and there is now in course of erection a 20-stamp mill, the machinery for which has been completed in this city. It would now be in operation but for the obstructions to transportation caused by bad weather. The property is under the management of Mr. Patterson.

THE Reno reduction works were just overcoming the many difficulties and becoming fairly prosperous, when destruction by fire entailed a direct loss of \$50,000, and an indirect loss of many more thousands to Reno and the State of Nevada generally.

THE Koreans have some good silver, gold and copper mines, but do not like foreigners to become interested in them.



AT THE BREAST OF THE RED POINT DRIFT MINE.

basin and thence to the city. The pipes deliver 3,600,000 gallons a day for domestic service. The two systems, domestic and irrigation, are entirely separate.

In the boring of wells on a large area such as may be considered at Oakland, great care must be taken as to taxing the available supply of water in the artesian strata. All the way from Berkeley to San Jose wells are found, so there is no fear of failure. The only thing is to do the boring systematically and properly, having only a certain number of wells in a given area, and boring them with proper relation to each other. There is a proper and an improper way of locating the wells. In a former number of

ject to local modification, would be to dispose the wells in a curved line, convex toward the collecting tract, for when the draft of the wells has made itself felt upon the sheet of water flowing most directly from the collecting belt to them, the higher pressure which the flanking portions still suffer will cause a lateral inflow, and the curved disposal of the wells will be more favorable for receiving the ingathering current than a rectilinear arrangement, being more nearly normal to the resultant pressure and flowage.

In respect to the degree of separation the farther they are apart the better, for they will affect each other less; but, of course, prac-

letting Mexican lead ores in free. The lead-miners of this country are violently opposed to this idea, for the custom is ruining the lead mining industry, whatever it may be doing for the smelters.

MR E. K. STEVENOT says the mining business about Angels Camp, Carson Hill and Chaparral Hill, Calaveras Co., is very prosperous, as they are mining on business principles and handling ore which a few years ago was impossible. There will be a good deal of wealth taken out of the mines situated between the Stanislaus river and Angels Camp, and new properties are being developed right along.

The Pittsburgh Boiler Scale Resolvent.

This Resolvent IS NOT AN EXPERIMENT but a FACT, and it will do the work claimed for it at a LESS EXPENSE than any other boiler purge, AND IN NO MANNER INJURE THE IRON.

CARNEGIE BROTHERS & CO., PROPRIETORS OF EDGAR THOMSON STEEL WORKS, }
PITTSBURGH, PA. WORKS AT BRADDOCK. } Oct. 4, 1887.

We use the Pittsburgh "Boiler Scale Resolvent," and are well satisfied with the results obtained. We have tested nearly all Compounds presented to us, and this one is the only good thing we have ever used. Our feed-water is heated in Berryman Heaters, but owing to distance of heaters from boilers, we rarely exceed 150 degrees of heat in feed-water.

Our water is of the worst character, containing such bad impurities as sulphate of lime, carbonate of lime, mud, and everything that is bad. Very truly yours, WM. R. JONES, Gen. Supt.

No water in the United States produces scale in greater quantity or of a harder nature than the Monongahela River, containing SULPHATE and CARBONATE of lime, iron, MAGNESIA, SILICATE, SULPHUR, ALUMINUM, etc. The following well-known manufacturers, who are large steam users IN PITTSBURGH, and using the water from said river as boiler-feed for all their boilers, USE THIS RESOLVENT in their steam plant, and to whom reference is hereby made: Carnegie Brothers & Co., Proprietors of the Edgar Thomson Steel Works; Dilworth, Porter & Co.'s Spike Works; and Oliver and Robert's Wire Co.; and many other firms in the great manufacturing center WHERE THE RESOLVENT IS MADE. Reference is also given to Robert McMahon, Boiler Inspector for Alleghany Co., Penn., and to the following Railway Companies who use it on their locomotives: Kansas City, Fort Scott & Gulf Railroad; Central Iowa; Mexican Central; Delaware, Lackawanna & Western; Burlington, Cedar Rapids & Northern, Terre Haute & Indianapolis; Mexican National; and Denver & Rio Grande Western.

Upon receipt of order, WITH THE PROMISE OF FAITHFULLY CARRYING OUT THE PRINTED DIRECTIONS, we will furnish, FOR FIRST INTRODUCTION, a Barrel, or Half Barrel, of the Resolvent, and the invoice will bear the following stamp:

{ TO BE PAID FOR WHEN RESOLVENT }
{ PROVES ENTIRELY SATISFACTORY. }

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TATUM & BOWEN,

Sole Agents for the Pacific Coast,

Dealers in Improved Wood-Working Machinery,

Saw Mill Machinery, Engines, Boilers, Iron-Working Machinery, Supplies, Etc.,

Sole Agents for Hoe Chisel-Tooth Saw, Gardner Governor, Schultz Leather Belting, Etc., Etc.

34 & 36 Fremont St., San Francisco. 85 Front St., Portland, Or.

If in want of Machinery of any description, write us for Descriptive Circulars and Prices.

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WATER POWER TRANSMITTED BY ELECTRICITY

To Run your Mills, Hoists and Trams.

For Circular giving particulars send to

KEITH ELECTRIC CO.,

— MANUFACTURERS OF —

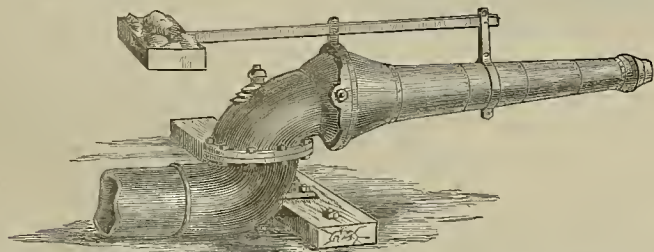
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Factory, Stevenson St., bet. First and Ecker,

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IMPROVED FORM OF HYDRAULIC GIANTS.

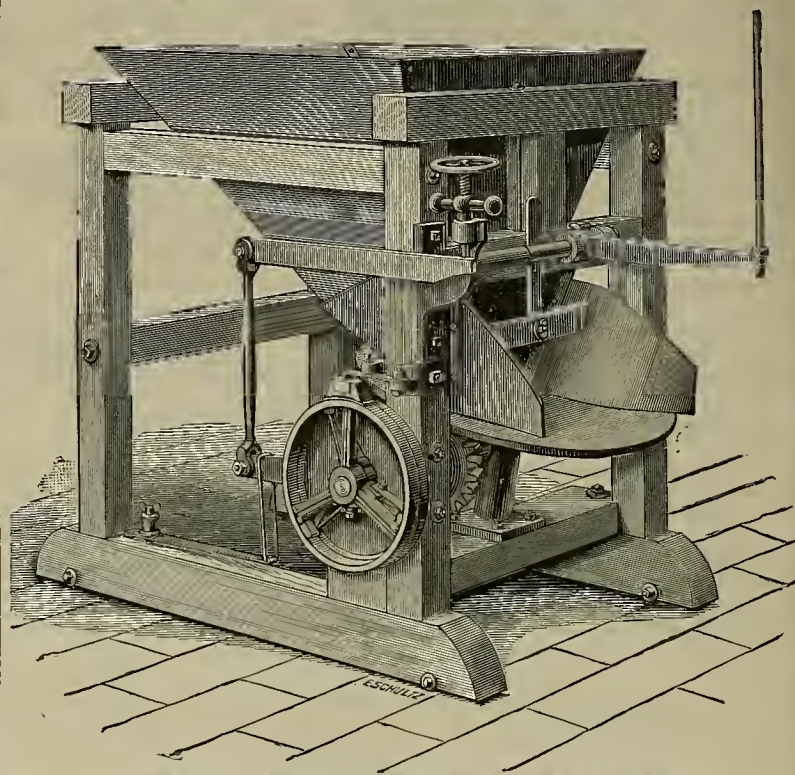


THE ABOVE CUT ILLUSTRATES THE IMPROVED FORM OF DOUBLE-JOINTED HYDRAULIC GIANTS which we manufacture. We guarantee purchasers of this form of Giants against all costs, expenses or damages which may arise from any adverse suits or actions at law. We are further prepared to furnish Single-Jointed Giants when required. Prices, discounts and Catalogues of our specialties of Hydraulic Mining Machinery sent on application.

JOSHUA HENDY MACHINE WORKS, 39 to 51 Fremont St., San Francisco.

DEWEY & CO. { 220 MARKET ST. S. F. } PATENT AGENTS.
Elevator, 12 Front

— THE —
JOSHUA HENDY MACHINE WORKS,
Nos. 39 to 51 FREMONT STREET, SAN FRANCISCO, CAL.



"HENDY" IMPROVED "CHALLENGE" ORE FEEDER.

The best form of Feeder ever devised, and pronounced by reputable mining men to be far superior to any form of "Roller" Feeder manufactured. We refer to the following gentlemen who have furnished us with testimonial letters to the above effect, which can be seen at our office, viz.:

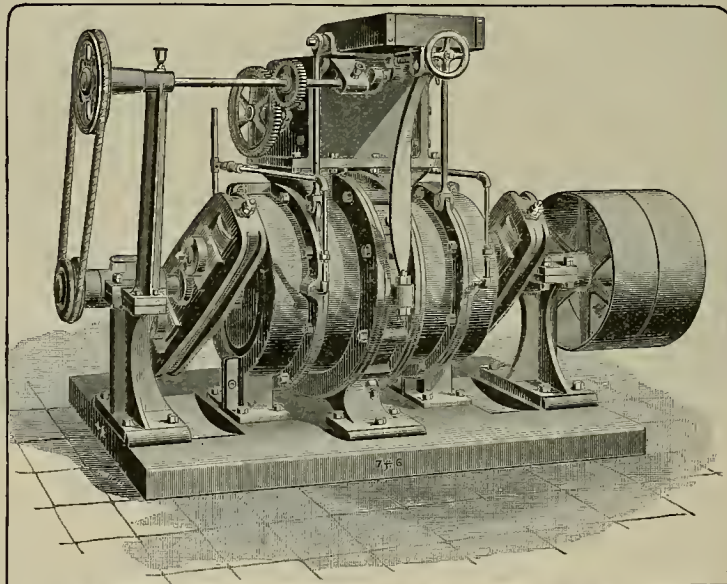
N. W. CROCKER, Supt. Bunker Hill Gold Mining Co., Amador City, Cal. D. C. WICKHAM, Taylor Mine, Greenwood, Cal.
W. G. ROBERTS, Greenwood, El Dorado Co., Cal. J. R. TREGLOAN, Supt. South Spring Hill Gold Mining Co., Amador City, Cal.

WE ARE MANUFACTURERS OF THE

"CHALLENGE," "STANFORD," "TULLOCK," & "ROLLER" FEEDERS,
And will furnish descriptive Catalogues and quote prices upon application.

FRISBEE WET MILL.

This Mill, with a weight of less than 9000 pounds, has a capacity of three tons per hour of hard quartz to 40 mesh; has been thoroughly tested; we guarantee its work as represented, and we will give long time trial.



IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS

And renewals will not cost over one-half as much as for stamps. Will run empty, or with small amount of ore without injury. The attention of parties having Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh; 30 to 35 H. P.

OUR DRY MILLS are the most economical ever built, and are extensively used with record of several years. No grinding in pans. Mill finishes to any fineness desired.

FRISBEE-LUCOP MILL COMPANY.

GIDEON FRISBEE, Manager, 59 & 61 First Street, San Francisco
HOOKER & LAWRENCE, Gen'l Ag'ts, 145 Broadway, New York.

AMALGAMATING MACHINERY.

Stamp Mills for Wet or Dry Crushing. Huntington Centrifugal Quartz Mill. Orying Cylinders. Amalgamating Pans, Settlers, Agitators and Concentrators. Retorts, Bullion and Ingot Moulds, Conveyors, Elevators, Bruckners and Howell's Improved White's Roasting Furnaces, Etc.

FRASER & CHALMERS, MINING MACHINERY

CONCENTRATING MACHINERY.

Blake, Dodge and Comet Crushers, Cornish Crushing and Finishing Rolls, Hartz Plunger and Collom Jigs. Frue Vanner & Embrey Concentrators, Evans', Calumet, Collom's and Rittonger's Silms Tables. Trommels, Wire Cloth and Punched Plates. Ore Sample Grinders and Heberle Mills.

IMPROVED CORLISS AND SLIDE VALVE STEAM ENGINES. ❖ BOILERS HORIZONTAL. VERTICAL ... AND SECTIONAL. ...
IMPROVED STEAM STAMPS

Holting Engines, Safety Cages, Safety Hooks,

Ore CARS, WATER & ORE BUCKETS,

Air Compressors, Rock Drills, Etc.

GENERAL MILL AND MINING SUPPLIES, ETC.

Sectional Machinery FOR

MULE-BACK TRANSPORTATION.



Pumping Engines and Cornish Pumping Machinery,

IMPROVED WATER JACKET

Blast Furnaces for Calena & Copper Ores,

SLAC CARS AND POTS,

Roots & Baker Pressure Blowers,

SUSPENDED TRAMWAYS.

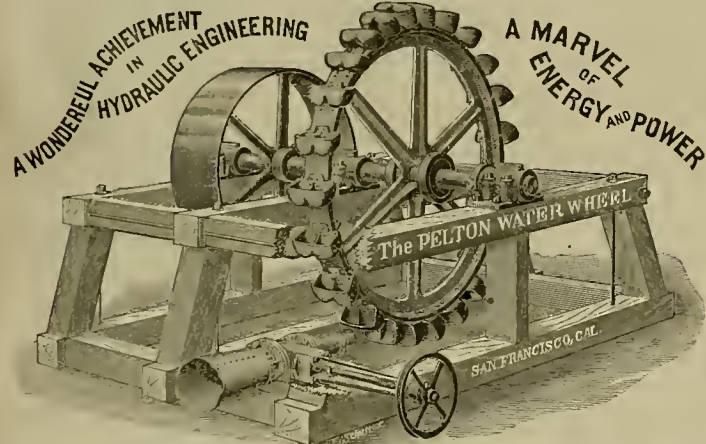
General Offices and Works: **FULTON AND UNION STS., CHICAGO, ILL.**

BRANCH OFFICES: NEW YORK, Room 43, No. 2 Wall St. DENVER, COLO., 1316 Eighteenth St. SALT LAKE CITY, UTAH, 7 W. Second South St. LONDON, ENG., 23 Bucklersbury, E. C. CHIHUAHUA CITY, MEXICO, No. 11 Calle de Juarez. LIMA, PERU, South America. JOHANNESBURG, TRANSVAAL, South Africa.
SOLE WESTERN AGENTS FOR TYLER WIRE WORKS DOUBLE ORIMPED MINING CLOTHS.

THE PELTON WATER WHEEL

GIVES THE HIGHEST EFFICIENCY OF ANY WHEEL IN THE WORLD.

OVER 800 ALREADY IN USE.



Affords the Most Simple and Reliable Power for all Mining and Manufacturing Machinery. Adapted to heads running from 20 up to 2,000 feet. From 12 to 20 per cent better results guaranteed than can be produced from any other Wheel in the Country.

ELECTRIC TRANSMISSION.

Power from these Wheels can be transmitted long distances with small loss, and is now extensively used in all parts of the country for generating both power and light.

APPLICATIONS

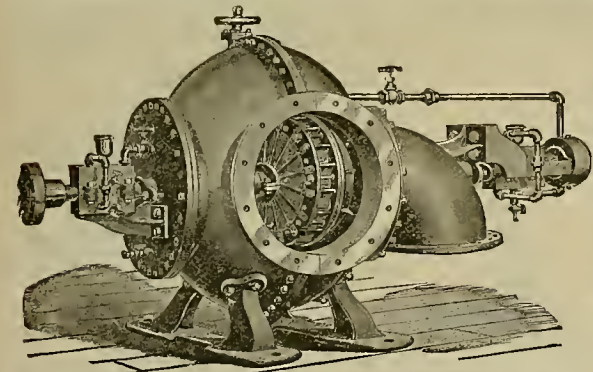
Should state amount, and head of water, power required, and for what purpose; with approximate length of pipe; also, whether the application is with reference to *Wheels* or *Motors* described below. SEND FOR CIRCULARS.

The Pelton Water Wheel Co.

121 MAIN ST., SAN FRANCISCO, CAL.

PELTON WATER MOTORS.

Varying from the fraction of 1 up to 15 and 20-horse power. Unequaled for all light-running machinery. Warranted to develop a given amount of power with one-half the water required by any other. SEND FOR MOTOR CIRCULAR. ADDRESS AS ABOVE.



JAMES LEFFEL'S Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

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FRASER & CHALMERS, General Agents, Chicago, Ill., and Denver, Col.

PARKE & LACY, General Agents, San Francisco, Cal

CALIFORNIA IRON YARD.

HENRY J. ROGERS & CO.
Successors to CHAS. CALLAHAN

IMPORTERS AND DEALERS IN
CAST AND WROUGHT IRON SCRAP
SECOND-HAND BOILERS
AND OLD MACHINERY
Of every description.

The Highest Price paid for all kinds of Metals.
OFFICE AND YARD: 125 and 130 Folsom St., S. F.
Telephone No. 67.

California Inventors

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THOMAS PRICE & SON,

Assay Office, Chemical Laboratory,

BULLION ROOMS and ORE FLOORS,

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COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

Metallurgy and Ores.

SELBY

SMELTING and LEAD CO.,

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GOLD AND SILVER REFINERY
And Assay Office.

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

...MANUFACTURERS OF...
BLUESTONE,
LEAD PIPE,
SHEET LEAD,
SHOT, Etc., Etc.

ALSO MANUFACTURERS OF
Standard Shot-Gun Cartridges,
Under Chamberlain Patent.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

ASSAYERS' MATERIALS, MINE
AND MILL SUPPLIES,

ALSO CHEMICALS, AND PHYSICAL, SCHOOL AND CHEMICAL APPARATUS.

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We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price.

Agents for the Morgan Crucible Co., Battersea, England. Also for E. G. Denniston's Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices. Our Illustrated Catalogue and Assay Tables sent free on application.

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Ores worked by any Process.

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Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of Mines; Plans and Reports furnished.

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GREAT REDUCTION!

BATTERY SCREENS.

Best and Cheapest in America.

No imitation, no deception, no planished or rotten iron used. Only genuine Russia iron in Quartz Screens. Planished iron screens at nearly half my former rates.

I have a large supply of Battery Screens on hand suitable for the Huntington and All Stamp Mills, which I will sell at 20 per cent discount.



PERFORATED SHEET METAL

For Flour and Rice Mills, Grain Separators, Revolving and Sift Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Iron, Steel, Copper, Brass, Zinc and other metals punched for all uses.

Inventor and Manufacturer of the celebrated Slot Cut or burred and Slot Punched Screens.

Mining Screens a specialty, from No. 1 to 15 (fine).

Orders promptly attended to.

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This Fire proof Brick Building is centrally located, in the healthiest part of the city, only a half block from the Grand and Palace Hotels, and close to all steamboat and Railroad Offices.

Laundry Free for the use of Families.

HOT AND COLD BATHS FREE.

Terms, Board and Room, \$1.00 per Day
And Upward.

Rooms with or without Board.

Free Coach to the House.
J. POOLEY.

MARKET REPORTS.

Local Markets.

SAN FRANCISCO, March 20, 1890.

General trade the past week was active, with a decided increase in the volume of goods going out on orders. The iron-molders' strike continues to be a drawback among foundrymen and machine factories. It now looks as if the disagreement will not be settled soon. So far as we can learn, the feeling in the community is against the strikers, for with labor and raw material cheap at the East, and overland freights to this coast considerably lower than a few years ago, foundrymen and machine factories must either get cheaper labor or cheaper raw material, or "shut up shop." Cheap raw material with the import duties so high is out of the question.

The money market continues to gain in ease under free remittances for the time of the year; while the demand for funds is only fair, not up to what usually obtains in this month.

QUICKSILVER—Receipts the past week aggregated 549 flasks. The exports by overland railroad in last month aggregated 27,000 pounds. The market continues to rule very strong. Both the European and Eastern markets are reported strong.

The exports hence by sea the past week aggregated as follows: 28 flasks to Central America and 215 flasks to Mexico.

SILVER—The market abroad and at the East strengthened and then set back again. The quick moves indicate that silver is under speculative influences. Political affairs in Germany, with their influences on other European countries, may possibly have considerable bearing on the market. The resignation of Prince Bismarck, as Chancellor of Germany, is taken by some as favorable to silver. This opinion is grounded on the fact that through Bismarck's influence Germany demonetized silver, and that the new Chancellor may hold to different views on the metal. In Congress no further action has been taken to remonetize silver, but in usually well-informed circles the opinion is gaining ground that at this session a free coinage bill will be passed. Judging from the petitions favorable to free coinage, sent in from all sections of the country to Congress, a large majority of Americans favor it.

The Mint paid 95½ cts. for silver bullion up to Tuesday, when the price was reduced to 95¼ cts. The offerings were very small. Exporters are out of the market, not being able to compete against the Mint, while sterling exchanges are weak and no present prospects of their going higher but rather lower, owing to the heavy exports of breadstuffs, provisions, etc.

BORAX—Exports the past week aggregated 658 lbs. to Mexico, and in last month 637,740 lbs. overland. The market continues to hold to full figures, with a free call from the East.

LIME—Receipts the past week aggregated 3288 bbls. The market shows a freer call, but prices remain steady. The impression prevails that the consumption this year will be larger than it was in 1889.

LEAD—The local market holds to steady prices. At the East the market has fluctuated, closing fairly strong. The holding interests are very confident of the future, and consequently offer sparingly, which helps in maintaining the strong market. English advances report an easy market.

ANTIMONY—The market is beginning to show signs of easing off, in sympathy with lower prices at the East.

TIN—Imports aggregated 2241 ingots from Australia. The market is fairly steady for pig, but for plate it is still flat. It is difficult to give correct quotations on plate. Several of the largest makers expect still lower figures. Late cablegrams to the Iron Age report as follows: "The Tin Plate Workers' Union have held further meetings, at which owners of 45 works, in addition to those who previously agreed, signified their intention to stop. Thirty others agreed to the proposal to stop during the last ten days of the month. Ten firms refuse to join the movement. The Union is determined not to be thwarted and will exhaust all resources to bring opposing masters to comply with their mandate. The Morewoods are the greatest obstacles. The Treforest will not stop for any great length of time. Stocks continue to accumulate at the shipping ports and amount now to 537,000 boxes against 336,000 boxes a year ago. The February exports to the United States were only 18,000 tons against 28,000 tons during the corresponding month last year. A larger business has been done during the week at inside prices."

COPPER—There is absolutely nothing new to report. The consumption in this country is steadily increasing, while the output does not show any material increase. From England late advices report as follows: "Copper bars are being gradually absorbed in the place of furnace material by consumers, but merchant warrants remain flat, speculation being affected by the depression on the Continental Bourses. A large business was done, chiefly for consumption, at £46 10s early in the week, since when prices have improved slightly."

IRON—Imports the past week aggregated 1000 tons. The market continues unsettled. Although no lower quotations are given, yet it is reported that concessions are obtainable. Probably this is due to a growing impression that the iron-molders' strike will result in fewer contracts entered into for new work, which will seriously curtail the consumption of iron. The stock here shows a large increase in the hands of both consumers and importers. From the East our advices indicate that consumers are holding off in the hope of still lower prices; when they do enter the market, it looks as if the market will improve. From England late cable advices report as follows: In pig-iron warrants there has been little business, but stocks in store are steadily decreasing, and that fact steadies the market somewhat. Hematites are improving in price. Makers have blown out six furnaces and agreed to further restrict production if necessary. Exports of pig iron to the United States last month 8000 tons, against 7000 tons in February, 1889. Makers' quotations for all descriptions of pig have been marked down, and are now nearly on a level with warrants.

COKE—Imports the past week aggregated 650 tons. While we do not reduce quotations, yet it is generally understood that concessions can be obtained.

COAL—Imports the past week aggregated as follows: Departure hay, 4406 tons; Coos hay, 1950; Seattle, 3849; Nanaimo, 2005. Total, 9210 tons. Australian coals are strongly held for spot, to arrive and for loading. All cargoes to arrive have been placed. Ships on spot and to arrive in Australian waters are showing more strength. This is reflected by a ship now loading lumber on Puget Sound for Australia, refusing a return cargo of coal to this port at the rate of 15s. In household coals the market shows no material change. The tone appears to be strong, due to the small stock on hand and to arrive of Australian. The expected advance in Wellington has not materialized.

Eastern Metal Markets.

By Telegraph.

NEW YORK, March 20, 1890.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday.....	43½	94½	\$14 25	\$3 97½	\$20 55
Friday.....	43 13-16	95	14 25	3 97½	20 60
Saturday.....	43½	95½	14 50	3 97½	20 60
Sunday.....	43½	95½	14 50	3 95	20 35
Tuesday.....	43½	94½	14 50	3 92½	20 30
Wednesday.....	43½	95	14 50	3 95	20 40

NEW YORK, March 18.—Borax steady. Quicksilver is firm in sympathy with the European markets. Copper is in moderate demand at 14½¢ @ 14¾¢; Lake, 12½¢ @ 13¢; Casting Lake reported well sold up. Pig lead is quiet and firm at \$3.97½.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, March 20, 1890.

ANTIMONY—					
BORAX—Refined, in carload lots	25	00			
Powdered " "	7½	00			
Concentrated " "	6½	00			
All grades jobbing at an advance.					
COPPER—					
Boiler	23	00	25		
Sheeting	23	00	25		
Ingots, jobbing	17	00	13		
Do, wholesale	15	00	16		
Fire Box Sheet	22	00	25		
LEAD—Pig	44	00			
Bar	5	00			
Sheet	7	00			
Pipe, discount 10% on 90 bags	1 45	00			
Buck, @ bag	1 85	00			
Chilled, do	1 85	00			
TINPLATE—B. V., steel grade, 14x20, to arrive	4	00			
Do, wholesale	6	75	7 00		
Charcoal, 14x20	6	00			
do roofing, 14x20	12	00			
do, do, 20x28	12	00			
Pig tin, spot, @	21½	00	21½		
COKE—Eng. ton, spot, in blk.	13	50	15 00		
Do, do, to load	14	50	15 50		
QUICKSILVER—By the flask	50	00			
Flasks, new					
Flasks, old	35	00			
IRON—Iron Ore, @ ton	10	00	10 00		
IRON—Base, @ ton	4½	00	31		
Norway, base	4½	00	54		
STEEL—English, lb.	15	00	20		
Canton tool	9	00	9		
Black Diamond tool	9	00	9		
Pick and Hammer	8	00	10		
Machinery	4	00	5		
Toe Oalk	4½	00			
IRON—Glenbrook ton	35	00			
Exglinton ton	35	00			
American Soft, No. 1, ton	—	00	35 00		
Oregon Pig, ton	—	00	35 00		
Black Diamond tool	35	00			
Clay Lane Wagon	62	00			
Shells, No. 1	35	00	35 00		
Bar Iron (base price) @ lb.	—	00			
Langdon	35	00			
Thurmeilife	35	00			
Gartberrie	35	00			
Barrow	35	00			
Thomas	35	00			
Cargollet	32	50			

Coal.

	Per Ton.	Per Ton.
Australian	7 50 @ 7 75	Lehigh Lump, 16 50 @ 17 00
Liverpool S.M.	8 50 @ 9 00	Cumberland bk 16 00 @ —
Scotch Splint	9 00 @ 9 10	Egg, hard 15 00 @ —
Cardiff	9 50 @ 10 00	

SPOT FROM YARD.

Wellington	\$ 9 00	Seattle	7 00
Greta	8 50	Coos Bay	6 00
Westminster Bymbo	9 00	Canal	12 00
Nanaimo	9 00	Egg, hard	18 00
Sydney	8 50	Cumberland, in sacks 15	
Gilman	7 00	do, bulk	14 00

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, department 10, San Francisco:

ELECTRIC STREET AND STATION INDICATOR, March 17. Capital stock, \$500,000. Directors—John L. Cahill, L. H. Foote, A. G. Hawes, Joseph D. Grant and Reuben H. Lloyd.

MERCANTILE BANK OF S. F., March 17. Capital stock, \$500,000. Directors—Wm. Kreling, J. Boas, Max Popper, T. G. Gruenhagen and L. Metzger.

ASPHALTUM PIPE & SUBWAY CO., March 17. Object, to mine, manufacture, distribute water and construct subways for electric conductors. Capital stock, \$400,000 all of which has been subscribed. Directors—F. M. Speed, Edgar Briggs, Adrian R. Smith, George H. Hops and W. H. Warswick.

PIONEER DIVIDEND ASSOCIATION, March 17. Object, to unite all healthy persons of every profession and business and occupation to make application for certificates and to provide a fund for a living as well as benefits for families of deceased members. Directors—Franklin N. Clark, I. G. Hanks, C. H. Clark, W. N. Letcher and W. Potter.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3.00 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	No.	AM'T.	LEVIED.	DELIN'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Bechtel Cons M Co.	California.	11.	10.	Feb 10.	Mar 17.	Apr 13.	C C Harvey.	303 California St.
Bentley M Co.	Nevada.	1.	8.	Mar 18.	Apr 22.	May 13.	W H Watson.	302 Montgomery St.
Butte King M Co.	California.	1.	30.	Feb 13.	Mar 20.	Apr 12.	W C Lewis.	723 Market St.
Confidence S M Co.	Nevada.	15.	75.	Mar 12.	Apr 16.	May 7.	N T Messer.	414 California St.
Crocker M Co.	Arizona.	8.	10.	Jan 20.	Mar 5.	Mar 28.	N T Messer.	309 Montgomery St.
East Best & Belcher M Co.	Nevada.	1.	25.	Feb 11.	Mar 14.	Mar 31.	O H Mason.	331 Montgomery St.
Eureka Cons Ditch M Co.	California.	1.	3.	Feb 24.	Apr 5.	Apr 21.	W H Baber.	224 Montgomery St.
Grant Prize M Co.	Nevada.	24.	30.	Jan 21.	Mar 5.	Mar 25.	R R Grayson.	327 Fine St.
Happy Valley Bl Gravel Co.	California.	6.	5.	Feb 12.	Mar 24.	Apr 4.	D M Kent.	330 Fine St.
Holmes M Co.	Nevada.	11.	25.	Mar 16.	Apr 17.	May 8.	C E Elliott.	309 Montgomery St.
Indian Creek M Co.	California.	1.	10.	Mar 12.	Apr 14.	May 14.	S C Mills.	325 Montgomery St.
Martin White M Co.	Nevada.	23.	25.	Feb 12.	Mar 31.	Apr 30.	A B Cooper.	325 Montgomery St.
Mayflower Gravel M Co.	California.	46.	50.	Mar 8.	Apr 10.	May 10.	A B Cooper.	309 Montgomery St.
Occidental Cons M Co.	Nevada.	5.	25.	Jan 20.	Feb 25.	Mar 24.	A K Dunbar.	309 Montgomery St.
Quaker G M Co.	California.	18.	20.	Mar 8.	Apr 5.	May 5.	A K Dunbar.	309 Montgomery St.
Silver King M Co.	Arizona.	2.	39.	Jan 15.	Feb 28.	Mar 27.	A Waterman.	309 Montgomery St.
Standard Cons. M Co.	California.	2.	25.	Mar 4.	Apr 14.	May 13.	J W Pew.	310 Fine St.
Union Cons M Co.	Nevada.	40.	25.	Mar 5.	Apr 10.	Apr 30.	J M Bullington.	303 California St.
Utah Cons M Co.	Nevada.	9.	25.	Mar 11.	Apr 17.	May 5.	A H Fish.	309 Montgomery St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
California Iron & Steel Co.	California.	F Bonacina.	438 California St.	Annual.	Apr 21
Champion M Co.	California.	T Wetzel.	322 Montgomery St.	Annual.	Apr 4
Dover M Co.	California.	W L McEwen.	214 Sansome St.	Annual.	Mar 27
Jackson M Co.	California.	R R Dray.	323 Fine St.	Annual.	Mar 24

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Champion M Co.	Nevada.	T Wetzel.	322 Montgomery St.	10.	Jan 20
Champion M Co.	Nevada.	A S Cheminant.	322 Montgomery St.	10.	Jan 20
On California & Va M Co.	Nevada.	A W Havens.	309 Montgomery St.	25.	Aug 6
Derbec Blue Gravel M Co.	California.	T Wetzel.	322 Montgomery St.	10.	Dec 23
Idaho M Co.	California.	R Heath.	Grass Valley.	2 50.	Mar 7
Mt Diablo M Co.	Nevada.	R Heath.	Grass Valley.	30.	Oct 23
Pacific Borax Salt & Soda Co.	California.	A H Clough.	230 Montgomery St.	1 00.	Feb 10

Mining Share Market.

The mining share market the past week was generally dull, although at times there were small short-lived spurts, evidently made to frighten shorts into filling so as to allow the pool to better concentrate the stocks they mostly desired. The news from the Comstocks is uniformly favorable—too good, if anything, to let the public have much of the stocks, and the public never buy on such a market as we now have. The outside stocks have not done much; hardly any transactions have taken place in either the Bodies or Quiltoas, while the Tuscaroras were only fairly traded in. The points are out for lower prices in the Tuscaroras, Bodies and Comstocks, although the latter might first go higher before going much lower. The Bodies are, it is said, to have a break when they are a "big buy."

News from the Comstocks is of the very best, particularly in the Gold Hill and the Middle mines. Private advices also report an improvement in Ophir. Advices from Con. Virginia still continue favorable. Official letters received to-day (Thursday) from Crown Point, Belcher, Confidence and Hale and Norcross report as follows: In Crown Point, the 300-foot stopes are improving as the work goes south. They are crushing on an average, about 850 tons of ore a week, which assays higher than that crushed in February. In Belcher a new south drift has been started which was in quartz assaying from \$5 to \$25 a ton. In Hale and Norcross the drift on the 1250 foot level was in fine ore six feet wide (fine ore, it is said, assays from \$40 to \$60 a ton.) In Confidence a west crosscut was started the past week on the 300-foot level and another on the 800-foot level. The first mentioned was, at last advices, in low-grade ore. The starting of these two crosscuts will be followed by others in some of the other mines through which the north drifts run from the Yellow Jacket shaft. This new work shows that the north drifts have either been completed or are nearing completion. These drifts were run to afford the best of ventilation in the mines, so that prospecting work could be successfully carried out.

One of the best signs of the times is the confirmed reports that the Comstock mines have bought more quicksilver so far this year than for the like time for several years past.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. C. HOAG—San Francisco.
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W. W. THORNTON—Los Angeles Co.
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LEACH ATHER—Fresno Co.
SAMUEL CLIFF—San Luis Obispo Co.
WM. H. HILLERY—Oregon.
E. E. DRENNING—Oregon.
CHAS. M. MOODY—Oregon.
H. G. PARSONS—Washington.
R. G. HUSTON—Montana.
HERBERT G. PANTER—Fresno Co., Cal.
A. J. WADE—San Bernardino Co.
T. J. MAY—Washington.
W. R. FROST—Humboldt Co.
H. KELLEY—Modoc Co.

Bullion Shipments.

We quote shipments since our last and shall be pleased to receive further reports:

Cons, California and Virginia, March 15, \$14,297; Savage (for February), \$24,073; Hale and Norcross (for February), \$31,198; Commonwealth, \$15,450; Justice, 20, \$4574; Commonwealth, 20, \$17,000.

A LANDSLIDE near Juneau, Alaska, buried one of the quartz-mills out of sight. No one was injured.

Attention, Southern California Miners.

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The Works are situated at Daggett, Cal., in the Calico Mining District, and on the side-track of the Atlantic and Pacific Railroad. They contain a first-class 50-horse power Engine and 45-horse power boiler, with Ore Crusher and other machinery, Mill Scales, Assaying Outfit, etc., all nearly new. Also upon the premises an office building and a comfortable dwelling-house (portable). The above can be had at a bargain. Apply to GILLISPY & CHILDS, 123 California St., San Francisco.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Feb. 27.	WEEK ENDING Mar. 6.	WEEK ENDING Mar. 13.	WEEK ENDING Mar. 20
Alpha.....	.90	1.10 1.70	1.05 .90	.95 .85
Alta.....	1.25	1.30 1.20	1.25 1.20	1.15 1.20
Andes.....	.75	.60 .45	.45 .50	.40 .45
Belcher.....	1.80	1.93 1.70	1.75 1.60	1.50 1.60
Best & Belcher.....	2.85	3 35 2.70	2.9 2.55	2.75 2.50
Bullion.....	.45	.65 .45	.60 .50	.60 .50
Bodie Con.....	.45	.55 .40	.45 .50	.45 .50
Bulwer.....	.25	.20 .15	.15 .15	.15 .15
Commonwealth.....	3.75	3.95 3.50	3.40 3.55	3.55 3.25
Confidence.....	4.50	5.00 4.40	4.6 4.25	4.40 4.15
Challenge.....	1.50	1.75 1.40	1.55 1.30	1.35 1.25
Chollar.....	2.45	2.62 2.50	2.50 2.00	2.30 2.25
Chollar & Co.....	3.50	4.00 3.75	3.75 3.25	3.45 3.00
Con. Imperial.....	.35	.40 .35	.35 .30	.30 .25
Calameda.....	.20	.25 .20	.21 .20	.15 .15
Crown Point.....	1.75	1.95 1.65	1.80 1.50	1.60 1.50
Crocker.....	.30	.35 .25	.25 .30	.30 .35
De Monte.....	1.40	1.55 1.35	1.75 .85	1.20 .90
Eureka Con.....	3.25	4.00 3.80	3.90 3.50	3.75 3.50
Excubiter.....	.45	.55 .45	.50 .45	.45 .50
Grand Prize.....	.35	.40 .70	.90 .50	.65 .55
Gould & Curry.....	1.45	1.73 1.35	1.45 1.20	1.40 1.30
Hale & Norcross.....	2.60	2.90 2.40	2.70 2.30	2.40 2.25
Julia.....	.25	.30 .25	.20 .20	.20 .25
Justice.....	1.10	1.50 1.40	1.50 1.30	1.40 1.25
Kennecott.....	.70	.80 .75	.70 .75	.75 .75
Lady Wash.....	.30	.25 .30	.30 .30	.30 .30
Mono.....	.30	.40 .35	.35 .30	.30 .30
Mexican.....	3.35	3.90 3.50	3.50 3.25	3.75 3.10
Nevado.....	.30	.25 .20	.20 .25	.30 .25
North Belle Isle.....	1.00	1.10 1.15	1.10 1.00	1.20 1.05
Nov. Queen.....	.80	.85 .90	1.00 .65	.70 .75
Occidental.....	.95	3.15 1.10	1.10 .95	.90 .75
Ophir.....	4.10	4.35 4.25	4.60 4.15	3.95 3.50
Overman.....	1.05	1.25 1.05	.95 1.05	.85 .95
Potosi.....	1.65	1.75 1.55	1.70 1.70	1.85 1.80
Peerless.....	.25	.25 .25	.25 .25	.40 .45
Peerless.....	.25	.25 .25	.25 .25	.40 .45
Savage.....	.60	1.80 1.55	1.45 1.60	1.45 1.15
S. B. & M.....	1.55	1.60 1.50	1.60 1.25	1.50 1.25
St. Helena.....	2.20	2.80 2.21	2.30 2.05	2.25 2.00
Silver Hill.....	.35	.20 .20	.30 .30	.30 .30
Silver Hill.....	.35	.20 .20	.30 .30	.30 .30
Union Con.....	3.25	3.75 3.50	3.25 3.10	2.95 2.70
Utah.....	.65	.80 .55	.65 .45	.55 .45
Yellow Jacket.....	2.15	2.40 .95	2.15 1.90	1.90 2.00

[Patented May 28, 1882.]

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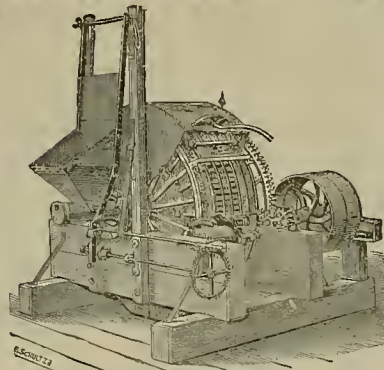
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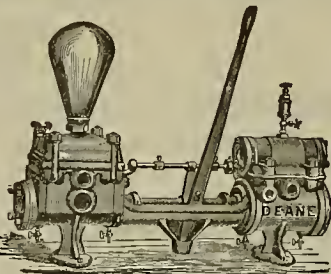
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A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

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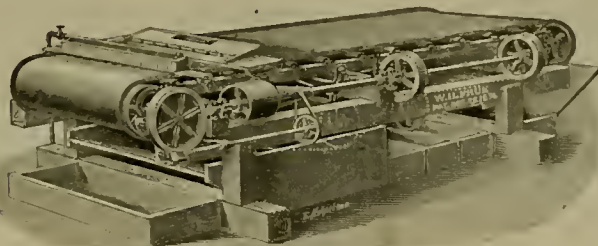
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THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.
DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly, THE MONTANA COMPANY (Limited).

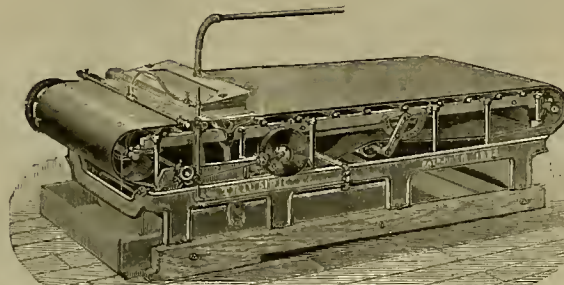
N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

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Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

Original Empire Mill and Mining Company,
Principal Office, 401 California St., cor. Sansome, S. F.
Location of Works, Grass Valley, Nevada Co., Cal.
GRASS VALLEY, NEVADA CO., CAL., NOV. 10, 1885.
Joshua Hendy Machine Works, 39 to 51 Fremont St., S. F., Cal.

GENTLEMEN—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.

At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrators is the equal, if not superior to any other style of Vanners or concentrating devices. DAVID McKAY, Jr.,
[Signed] Supt North Star and Original Empire Mining Co.

N. B. When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.

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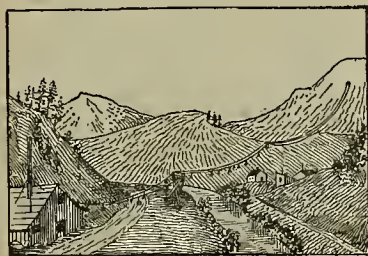
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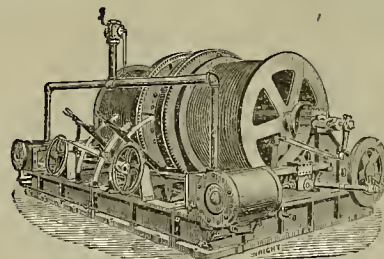
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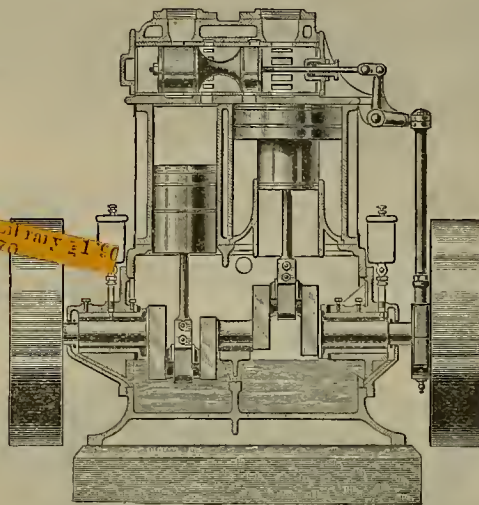
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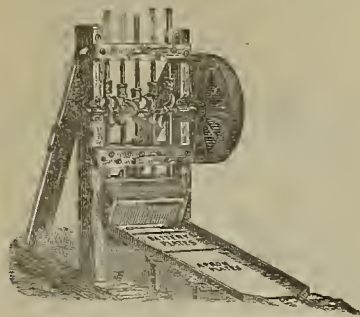
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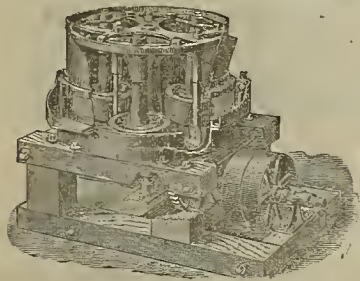
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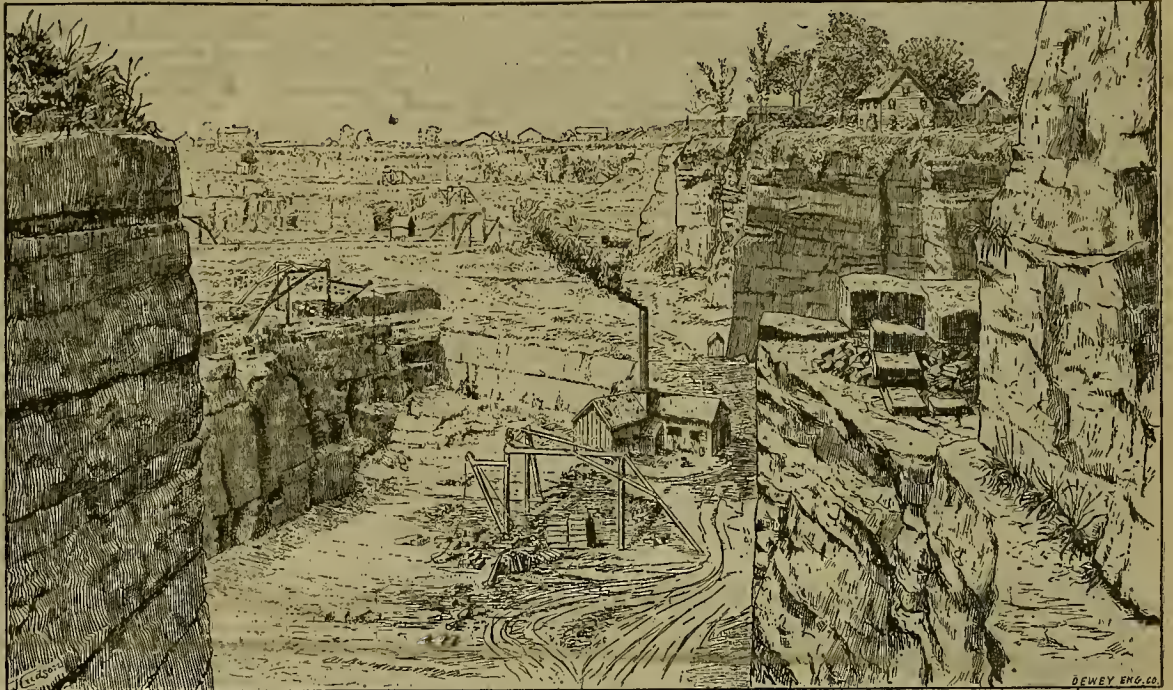
SAN FRANCISCO, SATURDAY, MARCH 29, 1890.

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Quarrying Sandstone.

We give herewith an engraving showing the method of quarrying triassic sandstone at Portland, Conn., taken from Geo. P. Merrill's Smithsonian monograph on "Building Stones." As now worked, the quarries descend with absolutely perpendicular walls on three sides for a depth of 150 feet, the fourth side being sloping to allow for the passage of teams and workmen. In quarrying, channeling machines are used to some extent, though in many cases large blocks are first loosened by powder and these then split up by wedges. The blocks are then slightly trimmed up and shipped, scarcely any of the material being dressed at the quarries. Some of these blocks have been shipped to this city. Little quarrying is done in cold weather, as care must be taken against freezing while the stone is full of quarry water, a temperature of 22° being enough to freeze and burst five blocks of freshly quarried material. About a week or ten days of good drying weather is considered sufficient to season a stone as to place it beyond danger from frost.

EDISON, the inventor, is experimenting with sulphuret ores from North Carolina, and is reported to have perfected a process for working them. It is to be hoped that he has a cheap method, in which case there is plenty of room for him to introduce his process in California.



VIEW IN A QUARRY OF TRIASSIC SANDSTONE.



DEWEY ENG. CO. S.F.

GRAND CANYON OF THE COLORADO—AT THE FOOT OF THE TOROWEAP VALLEY, LOOKING EAST.—See page 220.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

The Stewart Mining Bill.

A Defective Measure Criticised.

EDITORS PRESS:—In the spring of 1888, Senator Wm. M. Stewart intimated publicly that he wished miners and mining writers to criticize a mining bill he had introduced in Congress. This naturally led to the belief that he was willing to receive and would make use of sound, practical suggestions in perfecting the measure. Several correspondents of the PRESS offered excellent advice, and stated their objections to some of the changes proposed in the existing law. On March 10, 1888, there appeared in the PRESS a copy of a letter I had addressed to the Senator on that subject. In privately replying to my letter, he wrote on March 16th as follows:

"Yours of the 22d ult. came duly to hand. I have carefully considered the various objections suggested by you, and hope that when the bill is finally perfected, it will meet with your approval. I am not hurrying the matter at all, in order that everybody may have time to consider the measure and offer such suggestions as they see fit."

Last summer Mr. Stewart sent me a printed copy of his "amended" bill which, on January 10, 1889, had been ordered to be reported in the House of Representatives. Along with it was a lithographed letter, similar, as I afterward learned, to letters he had widely addressed to the editors of mining and local journals, again soliciting suggestions and criticisms in regard to it. In reply to his, I wrote him to say that it was useless to suggest amendments when it was plain they would be disregarded. I also informed him that unless his bill was improved, I should endeavor to defeat it by calling the attention of miners to its dangerous features.

Up to that time I believe Mr. Stewart was sincere in his repeated calls for practical hints, but on discovering the fact that he had not adopted a single suggestion made by PRESS correspondents, I changed my mind, and concluded that he required to be closely watched.

The editors of the PRESS, however, still had confidence in his sincerity, and besides printing the amended bill, they gave correspondents the privilege of publicly criticizing it. For a number of months there appeared at short intervals in its pages sound practical letters from distant points, in which the defects of the proposed measure were plainly stated. The criticisms in these letters were well fitted either to aid its author in improving it or to warn him that if no improvement was effected, he would have to face a dissatisfied mining public.

On December 4, 1889, Senator Stewart introduced a new mining bill in the Senate, which being twice read, was referred to the Committee on Mines and Mining. Through the kindness of Delegate M. A. Smith of Arizona, I have obtained a copy of the "perfected" bill. It is fortunate for the mining interests of the country that Mr. Smith is on the above committee. He is able, alert and enterprising, and if convinced that the proposed legislation is unnecessary, or deserving of condemnation, he will fight against it to good purpose. If the PRESS will on public grounds grant me space to criticize the new bill, I shall, in compliance with Mr. Stewart's repeated requests in past years, try to expose its true "inwardness" in the sight of practical mining men.

In place of this being a new bill, it is merely the old one of last year, and not one of the second set of suggestions toward improving it which appeared in the PRESS has been adopted any more than the published hints in its pages two years ago. The date and one unimportant word have been changed, that is all. This fact seems to indicate that Mr. Stewart must either regard the many objections—without any commendations—offered to the product of his mind as unworthy of consideration or he has been guilty of obtaining newspaper notoriety by means of representations that are very far from being creditable to him as a public man.

The First Change Proposed

In the Act of Congress approved May 10, 1872, under the Stewart bill, is by the addition to Section 2319 of the following: "But no person shall acquire by location more than fifteen hundred feet in length on the same vein, nor shall any person relocate a claim which he has previously located."

If there was a pressing demand by capitalists for mines to be explored in deep works, and our wide mineral domain was so well prospected and fully occupied that it was necessary to curtail the space each operator should control, so as to afford room for all, it might be wise to restrict a locator to a single claim on a given lode; but as there are hundreds of mining claims on the market for every cash buyer who appears, that time has not arrived.

Lodes in Groups.

The purchasers of mines in coming years will want lodes in groups, both to economize in work and prevent legal contests. They will not purchase from 20 claim-owners, some of whom will be sure to demand ten times the value of their property, but if they find one or two men controlling a series of promising claims which they can buy and test under a moderate outlay, they may be tempted to invest. The

time is past when a single undeveloped lode in an unproved belt can be sold at any price. In proposing this one-lode system Mr. Stewart seems to think that the locator is obtaining a \$20,000 gift from the Government, and to give him two or three times that sum is altogether too generous. If he knew or considered, however, that, except in rare instances, the claimant of mining ground may have to wait six, eight or even a dozen years before realizing anything from it, he would be more reasonable. Mr. Stewart ought to know that the prizes drawn by claim-owners do not exceed one to the hundred of blanks which amid great privations, disappointments and unrequited toil, are silently accepted as one of the contingencies of life. It is to the exploring skill and persevering work of trained and educated prospectors that we must look in the future for additions being made to the producing mines of the country. It is no longer possible for a "lucky tenderfoot" to stumble on a body of rich ore spread out on the surface for him to claim, and perhaps within a month to sell for a fortune. Since the days of speculation are over, prospecting for mineral lodes has become a legitimate business, in which the dissipated adventurer of early times can scarcely hope to succeed. The skilled prospector, like the inventor, creates something out of nothing. To hinder a locator from grasping his claims is simply putting a barrier in the way of future investors. To put him in subjection to a law which practically declares that when by years of persevering effort he has found a promising lode, he must be careful to give several loafers, who have been watching his operations, an opportunity to step forward at the right moment and claim extensions to his discovery, is neither wise nor just. The man who in a worthless mountain discovers a lode that in coming years will yield millions of dollars in bullion, is a benefactor to the world, and he deserves to be encouraged in making explorations by the right to locate all the claims he can work or utilize. Not one claim in a dozen proves of sufficient value, under the work that a prospector is able to do, to warrant him in holding it, unless he has the prospect of making a sale. As he is well aware of this fact at the outset, he wants to locate several claims, from which to select, after tests are made, the ones he will continue to hold.

The One-Lode Proviso.

But the Stewart one-lode proviso cannot be enforced. A discoverer will use the names of friends and locate as many claims as he desires. Is it wise to make laws that can be easily evaded? If adopted, it would in "faulted" or "dislocated" mining ground prove the cause of costly litigation. In such cases, and especially where the lodes do not appear boldly on the surface, it is very difficult to determine their true courses.

Suppose, then, a locator finds a vein seemingly running north and south and stakes it off, and later on finds another higher on the mountain which he also locates. He sells the first location for a small price so that he may be able to work on the other, which at a later date is bought by a second investor.

After years of outlay by two companies it is proved that the former is on a "slide," and both locations are on the same vein. Then will come a conflict in the courts, and experts will testify as to the "apex" of the lode lying within one set of surface lines, while its main body is elsewhere, but if a vein connection can be made from the first location, the owners of the second may lose everything. But why in the name of common sense should statutes be framed that can by any possibility bring about such contests? If Senator Stewart is disposed to argue that the contemplated change in the law would not have the effect described, he will in that fact prove that he does not possess sufficient practical knowledge on the subject to enable him to deal with it legislatively.

If his real object is to promote litigation, one can easily perceive how consistently he is striving to attain his end and understand also why he has disregarded every suggestion and warning he has received.

Relocating Forbidden.

The quotation already given from the Stewart bill forbids, as will be seen, the relocating of mining ground by any person who formerly owned it. In a mining camp which has been dead for years, it seems unreasonable to decree that an abandoned lode may be claimed by a prospector who never saw it before, while its original discoverer shall not be allowed to touch it. In such a case the lode had probably years before returned to the mineral domain, and having become free to all, why should the man who by reason of adversity or local depression was forced to let it go be excluded, when better times have come, from resuming possession?

If the Stewart law were in force it would be the cause of much mine-jumping and serious loss to the owners of imperfectly located lodes. It is often the case that uneducated men fail to describe their claims according to the law. Usually this defect is corrected when a survey for patent is made, but under the Stewart measure such a correction could not be effected. If it were enacted, steps would be taken to find flaws in the record notices of every mining claim of promise. Surely no equitable interest can be injured by giving the owners of each ground the right as they have at present to amend their location notices by re-recording.

The constant relocating of mining claims at the end of every year is an evil which ought to be stopped, but that can be readily done by

making it imperative that before a relocation could be recorded, an affidavit must be produced showing that a specified amount of work had been done. By doing such work beforehand, a defective location could be amended. If the owners of old locations found that relocating was nearly as expensive as holding them by work, it would soon be given up. This was one of the changes in the present law suggested by a PRESS correspondent to Mr. Stewart, but it did not suit his views. The enactment he suggests would leave matters just as they were before—the new law, if adopted, would be evaded by using the names of friends in relocations.

A Bad Change.

Section 2324 of the Revised Statutes is changed by the Stewart bill to read as follows: "All records of mining claims hereafter made shall contain the name or names of the locators, the date of the location, and such a description of the claim or claims located as will identify the claim." In the mining law of 1872, the words "by reference to some natural object or permanent monument" are found after "claims located" in the above extract. It will thus be seen that Mr. Stewart seeks to do away with that clause in our present law which has made it impossible to perpetrate frauds by means of "floating" locations. Under the indefinite requirements of the law of 1866 as to locating mining grounds, it was an easy matter for rascals to assert and prove that some new and valuable discovery belonged to them.

On turning to the records, a claim in their names would be found, but its position not being stated, it would be used whenever its owners might declare the location was originally made. Prior to 1872, the locator of a promising lode was almost certain to find his title disputed by men who had never seen it before, and in one well-known case in Eureka, Nevada, a location was "floated" several miles, and in a costly suit the legitimate owners lost their property. What, then, can Senator Stewart's object be in proposing so to change the law that there will be no necessity for anchoring a claim down to some particular hill, as many feet or yards approximately from a peak, iron tower, spring or fork in a well-known ravine? Does he not here once more show that he wishes to promote litigation?

The vague language he substitutes for the present clear and entirely satisfactory requirement in locating a lode will not only admit of frauds being commenced again, but will seem to encourage them. Would not fraudulent locators always be ready to "identify" their claims? The great trouble 20 years ago was that "identification" was altogether too easy, and if Stewart's "amendment" is adopted it will become very easy once more.

The requirement in the Stewart measure that surface lines of a claim should be shown by posts or monuments would not remedy the evil, for false testimony as to these would always be available. Those of us who knew Attorney William M. Stewart contesting mining cases on the Comstock lode, nearly 30 years ago, are aware that he is fully alive to the importance of monuments when questions of identity come before judges and juries. Has not he heard of cases in those early days when men who had not been in the county more than three months could confidently testify that three years before they had seen certain disputed posts securely placed? In that part of his bill which describes how patents are to be obtained, Mr. Stewart makes it imperative that a lode should be described "with such reference to natural objects or permanent monuments as shall identify the claim and furnish an accurate description to be incorporated in the patent." He is willing, then, it appears, to let down the hare for unprincipled locators, but knowing that the hare must be up before a patent can be obtained, he lays the burden of descriptive accuracy on the mineral surveyor.

Senator Stewart's English.

It may seem ungrateful in a Western miner, for whose interest the Senator assumes he is legislatively doing so much, to take exception to the language used in his "finally perfected" mining bill. For purely philological purposes this time I copy again one of his cherished utterances: "All records of mining claims hereafter made shall contain the name or names of the locators, the date of the location, and such a description of the claim or claims located as will identify the claim." The critical reader will not fail to notice how strangely these 36 words are flung together. They seem to suggest the idea that when they were lannohed into being they came in such a crowding, rampant way that it was impossible to marshal them in presentable files or to coax them into the places where they rightfully belonged.

A common writer not given to the building of wordy structures would probably have said: "Every record of a mining claim hereafter made shall give its date, the name of each locator, and such a description as shall identify it." The Senator, of course, would scorn to accept these 25 words as an improvement on his own flowing language, just as he spurned the mining suggestions which came to him from widely separated regions.

Very Vague Language.

Here is another proposed change in Section 2324 of the Revised Statutes: "Where several adjoining claims, not exceeding five, whether the same be lode or placer claims, are owned or held by the same person, association, or corporation, and the sum of \$1000 or more is expended

in any one year in good faith for the development of all of the claims so owned, or held, not exceeding five, there shall be no requirement for separate labor or improvements to be performed or made on the several claims so owned or held during such year." The above seems to be intended for the benefit of rich men. By expending \$200 for each claim in place of the \$100 required of common miners, the necessity for doing work on any of them is set aside. It is not said that a thousand dollars must be expended on the claims in actual work. If it is paid out "for" their development, that would suffice. Under this proviso a man owning five placer claims each of 160 acres might expend \$1000 a year on a dam ten miles away, from which in coming years he intended to bring water to develop them and would not be required to do local work, or if a person owned four lode claims on a mountain slope and had a placer location below them, \$800 of his outlay in extracting gold from the latter would count as the assessment for the former. At first it looks as if the measure related to a central tunnel, the opening of which would benefit all of the claims, but that cannot be what was intended, as there is a separate tunnel requirement in another part of the bill. Perhaps Mr. Stewart knows what he meant to say, but he certainly has failed to make his meaning plain to ordinary people.

But why should lode and placer claims be mixed up in this way for assessment purposes? There is nothing in common between them either as to the kind or value of the work to be done. And why should an outlay of \$200 on lode claims exempt their rich owners from surface work, while the poor miner who cannot expend \$1000 on his five claims must dig a \$100 hole on each of them? If this is not an attempt at special legislation, under what other name can it be designated? In his last year's bill our great law-giver named \$5000 as the sum that the owners of five claims were to disburse, but this year he reduced it to \$1000—being the only change effected in the measure.

It is a great advantage to the poor claim-owner that he is enabled now to concentrate his labor on several lodes on one or upon a central tunnel. Surface work done on lodes merely to comply with the law is in a great measure thrown away. It develops nothing, whereas the same labor applied to one lode may produce a paying property. It will be observed that whether Senator Stewart intended it or not, his contemplated change in the law, if success attends his efforts, will be a misfortune to the poor claim-holder. Is the liberality of our Government in mining laws to be suddenly withdrawn? And are the miners of the nation supple enough to allow the Nevada Senator to dictate and pass any kind of unreasonable or unjust law he may choose to frame, without a protest or an effort to frustrate his schemes? I believe they are capable of protecting their own interests as soon as they find that these are in peril.

JOHN DARE EMERLEY.

(Concluded next week.)

The Comstock Lode.

EDITORS PRESS:—The MINING AND SCIENTIFIC PRESS has been the only paper to give an intelligent description of the recent favorable prospect of the Comstock mines.

From personal observation and a careful study of the work in the different mines, I am not only able to verify what you have published, but also give the following additional information which will unquestionably prove of interest at this time:

The west wall of the ledge found in the Hale and Norcross mine, and the continuation of which is now being opened up in the Potosi, takes a sharp bend to the west (about 200 feet south of the first-named mine), in the Chollar mine's ground. For the past 15 years, all the Gold Hill mines south of that bend have been prospecting to the east and far away from this particular location. The practical demonstration of a sharp bend in the west ledge is found in the Alpha-Exchequer west drift, 500 foot level, where the west ledge, 60 feet in width, has been exposed. The Alpha Mining Co.'s shaft is several hundred feet west of the Bullion and Con. Imperial Mining Companies' shafts; therefore from the east workings of these mines in Gold Hill to the west ledge, it must be all of from 1000 to 1500 feet. In the Belcher mine, still farther south and 500 feet west of their former workings, they report the finding of this ledge, wherein 40 or more feet of fine mineral-bearing quartz is exposed.

In the face of these facts, a majority of the California press is devoting its columns to attract the attention of stockholders from the truth by holding the Con. Virginia mine up as an object-lesson, and at the same time showing the impossibility of the mine paying many more dividends. There are other mines on the Comstock that will be proven rich in mineral ore as prospecting work is prosecuted in the great basin lying west of the Gold Hill mines, extending from the bend in the Chollar mine to the Overman mine south. The ore in this ledge ranges from 60 to 90 per cent in gold. This by practical mining men is considered the most important discovery that has been made since 1871, when Senator James G. Fair ran his prospecting drift through the Gould and Curry mine and discovered the ore body or bonanza in the Consolidated Virgins.

MINING ENGINEER.

Virginia, Nev., March 23d.

Trusts and Futures.

The Hon. B. A. Eoloe, of Tennessee, has kindly sent us a copy of his timely and excellent speech in the House of Representatives, on the resolution proposing an amendment of the Constitution for the suppression of trusts and gambling contracts in agricultural and other productions. The measure has so largely attracted the attention of the farmers and laboring classes, that Congress ordered the printing of a large amount of extra copies, to supply the demand. A bill was introduced during the first session of the Fiftyeth Congress, for the suppression of option dealing, and was referred to the Committee on Agriculture. It was found on investigation that Congress could not interfere in such cases without disturbing the stability of contracts. The only clause in the Constitution that permitted an approach to this sort of legislation was the clause under which the Interstate Commerce law was enacted, and that was thought to be too vague and shadowy for Congress to enter this domain of contracts. Hence the bill was reported adversely. The pending resolution proposes to reach and cure this evil by an amendment to the Constitution. Mr. Eoloe says:

"My reason for embracing trusts and other similar combinations in the same amendment will be found in the fact that the two evils have their origin in contracts of the same general character. Combinations to limit the production and to fix the prices of commodities, combinations to arbitrarily fix the supply and the prices of labor, and combinations to control markets, all rest on the same footing and have a common origin with option dealing. They all originate from contracts which are illegal and contrary to public policy, contracts which give birth to great and powerful enemies to the public interests."

It would seem that the safest, enrest, and most direct channel for public opinion to take in suppressing the enormous evils of trusts and option dealing is along the line of Constitutional Amendment. Other remedies are doubtful and may lead to interminable litigation. This lays the axe at the root of the tree. The demand for this kind of radical remedy is emphasized by the platform of both parties. It is voiced by public speakers of all shades of political opinion. The press is practically a unit on the subject. "For Congress to refuse to take any action in this matter," says Mr. Eoloe, "would be to plead guilty to a degree of political hypocrisy and demagoguery which would go far to destroy the confidence of the people in the good faith and integrity of their representatives."

The demand for relief from the destructive influences of gambling contracts in agricultural products is most emphatic. It comes from the farmers and laborers. It comes from the producers; from the bone and sinew of the country. It comes from those who contribute most largely to the support of the Government. Organized labor, in the shape of the State and National Grange and in the great convention recently held in St. Louis by the farmers of the West and South, have emphatically demanded that Congress shall take immediate steps to suppress dealing in futures.

While all admit this evil and the urgency of some sort of remedy, there may be a few who fear that a constitutional amendment may tend to the centralization of power in the Federal Government. The ghost of Thomas Jefferson rises before them; but this country has grown immensely since his day. This great statesman in the wildest flights of his imagination never dreamed of such a thing as an Interstate commission coming in to regulate the vast commerce of 60,000,000 of people, over 150,000 miles of railroad traversing every State in the Union and welding them together with bands of steel. It never occurred to him that a time would come when through the agency of electricity the people in Washington and New York would hold a conversation in less time than he could ride from the White House to the Capitol. Had he caught a politician talking to a phonograph, he would have thought him a fit subject for the lunatic asylum. It never occurred to his fertile brain that there would come a time when men in New York and Chicago would become millionaires dealing in crops before they were planted, selling property they never owned, selling the property of other people without their consent, selling millions of dollars worth of property more than the whole country annually produced. It never occurred to him that a time would come when favoritism would control legislation in the interests of capitalist classes to such an extent that transportation, the manufactures, the sale of agricultural products, would be concentrated in trusts, combines and other monopolies, and the prices of labor and products arbitrarily fixed by the caprice of a greedy, selfish syndicate.

Men who claim to be statesmen will attempt to silence the complaints of the people by word-pictures of the unexampled prosperity of the country. In the closing words of Mr. Eoloe's speech:

"Pictures of the nation's prosperity painted in the most glowing colors will not lift the mortgage from the farm nor feed and clothe the wife and children. There is no disguising the fact that millions of American laborers stand like Tantalus surrounded by fruits and flowers of a nation's prosperity which they can neither touch nor taste, up to their necks in streams of

national prosperity from which they may not drink.

"Everything they touch turns to gold, and many of them, like Midas of old, are starving in the midst of the wealth which their magic touch has created. Long arrays of figures to prove the prosperity of the nation will not appease the pangs of hunger nor shut out the cold blasts of winter. If you would lighten the burdens of labor and smooth the wrinkled foreheads of men from the brow of labor, if you would nerve the arm of the toiler which is well-nigh paralyzed by the oft-repeated disappointment of false hopes inspired by the false promises of false teachers, if you would restore the prosperity of the masses, take the hands of the robbers, created by class legislation, out of the pockets of those who toll; make the classes who are riding the tax-payers, hooted and spurred, get down and walk; stop piling burdens on industry for the benefit of those who neither toil nor spin; blot out from the face of the earth the trusts and monopolies that grind the faces of the poor, and force the dealers in 'wind' to live on the wind or work for an honest living."

Car and Battery Assays.

The officers of the Mining Stock Association have written the following letter:

The Mining Stock Association of this city has been endeavoring for some time past to induce the various ore-producing mining corporations of the Comstock to publish a full statement of the value of the ore produced. This can easily be done by giving the car assay value as the ore comes from the mine, and the pulp assay at the battery of the mill.

As these assays are always made by each ore-producing mine, there would be no additional expense incurred, and the information so given would be a source of the greatest value and satisfaction to stockholders. There certainly can be no objection to the publishing of these facts, viz.: the car assay of the ore produced and the pulp assay. No honorable mine manager would decline to do so. That it is not already done by all the ore-producing companies is undoubtedly due to inattention, as the subject is of too much importance to be omitted intentionally by any honest mining corporation.

It is worthy of notice in this connection that the Overman Mining Company, in their report for the week ending March 8th, give both car and battery assays, and the management deserve commendation for so doing. It is true that it is a new departure, but one that all ore-producing companies should follow.

The business of dealing in mining shares has shrunk to such a point that it has become unprofitable. Any change or reform that would benefit and increase the business should be looked upon with favor by both mining-stock holders. We believe that the publishing of the facts mentioned in reference to the ore produced would tend toward regaining the confidence of the speculative public.

We would suggest that both mining-stock boards make it imperative for all mines listed to publish the two assays mentioned of all ore produced.

CON CALIFORNIA AND VIRGINIA.—The official returns of the ore crushed and bullion produced for account of the Consolidated California and Virginia mine for the month of February have been received. There was worked at the Morgan mill 3480 tons of ore, yielding bullion of the assay value of \$73,883.79, of which \$38,528.52 was gold and \$35,355.27 was silver. The average yield in bullion per ton was \$21.23, and the assay value of the ore per ton was \$21.04. There was worked at the Eureka mill 5800 tons of ore, yielding bullion of the assay value of \$128,149.42, of which \$68,380.44 was gold and \$59,768.98 was silver. The average yield per ton in bullion was \$22.09, and the average assay value of the ore per ton for battery samples was \$26.05. There was worked at both mills a total of 9280 tons of ore, yielding bullion of the assay value of \$202,033.21, of which \$106,908.06 was gold and \$95,125.15 was silver. The average yield in bullion per ton was \$21.77, and the average assay value of the ore per ton was \$26.98.

GOLD QUARTZ MINING.—More prospecting and mining is being done here this winter than for years. Spenceville and the adjoining vicinity north of it is certainly situated in a very rich mineral belt, but you will find some unscrupulous persons who are ready to swear mineral off of any section of land the railroad company may wish to acquire a patent for, and to-day they and their agents are attempting to get control of a piece of land here on which three different mines are in active operation, and others will be worked as soon as the weather will permit. It appears that it is about time for people who are interested in mines and mining to do something for themselves and prevent mineral lands from passing into hands that will forever forbid the development of the mining interests of this county. If mining men have been asleep, the Eagle Bird decision should have awakened them to the fact that this particular interest should be vigilantly watched now and attended to, and not when it is too late.—*Grass Valley Tidings.*

AFTER seven years, a number of Bodie miners have received money due them for work on the Noondays. Patrick Reddy and Wm. H. Virden have credit for pushing the claims.

Coast Industrial Notes.

WORK on the Stanford University has stopped for the present.

The contract for carrying mails on Lake Tahoe has been awarded to E. J. Baldwin of San Francisco. He has ordered a fast steamer built at Buffalo, N. Y., for this purpose, and it will also carry passengers to all points of interest.

A SURVEYING PARTY of ten men, with three carloads of material comprising camp and grading outfits, has been sent from Stockton to Oakdale to begin the work of extending the Oakdale road from Oakdale to Merced, a distance of 40 miles. It is expected that 400 laborers will be put to work in a few days.

The construction department of the Southern Pacific Co. will overhaul the snow-shed system along the mountain road this summer. Much of the present shedding will be torn down and done away with altogether, while that which remains will be strengthened and strongly braced with steel and iron rods. New snow-plows to make the total in use ten will be placed along the road.

THERE is quite a number of vessels fitting out for Alaska to engage in the salmon-fishing business. The Alaska Commercial Company's steamers Bartha, Dora and St. Paul have been brought to the city and will be overhauled and loaded, and will leave for the north in about a week. Business is comparatively brisk along the water-front, and every vessel which leaves takes away a number of men, both white and Chinese, for cannery work.

WORK is to be commenced shortly upon the plant for an extensive sulphur refinery, which is to be located in North Oakland, near Shell Monnd Park, in the building formerly occupied by the antimony works. The building is 60x100, and a new addition 30x30 feet, which it is expected will be completed within two weeks. The machinery is being manufactured at the Oakland Iron Works in this city. The process is a new one, invented by Bowen & Co. The works will be operated by Sherwood & Sherwood of San Francisco.

OUR California trade with the Pacific Islands is quite large. In February our export trade with the Hawaiian group amounted to \$302,526; Figo, \$222; Simon, \$303; Philippines, \$227; Society, \$53,250; Marquesas, \$3236. Total, \$369,495. The increase this year over last is \$128,743. For the two months of this year our imports, mainly sugar, were valued at \$1,359,039. The combined movement, sail and steam, shows a total of 33 vessels and of tonnage 20,872 employed during the past two months in the Hawaiian trade.

COLONEL WALTER S. MOORE, chairman of the State Board of Forestry, has returned from a visit to the Chico Forestry Station, the land for which was donated by General John Bidwell, and which he states is in fine condition. The board is especially interested in the Australian wattle, which is used in tanning, and which, it is thought, will in time take the place of the tan bark oak, now very nearly exterminated. A ton of wattle bark equals six tons of oak bark, and the trees are ready for stripping at four years of age. Colonel Moore thinks they will prove of incalculable advantage to California in the near future. One great peculiarity about the wattle is that stripping does not kill it, because in a short time a new bark is formed.

THE thickest and at the same time the heaviest leather ever seen in this market, or in all probability in any market in the world, has been received by S. H. Frank & Co. from their tannery in Ridwood City, and created much comment among those interested in that commodity. The hides come from cattle in the northern part of the State, and although not unusual as regards size, were remarkably thick and heavy. It required eight months to tan, and the enormous gain of 75 per cent during the process was noted, the usual gain being about 65 per cent. The sides of tanned leather are double the thickness of ordinary sole leather, and weigh from 50 to 60 pounds each. The rolls in which they are done up weigh from 448 to 504 pounds. It was the opinion of all who examined this leather that it was in all respects the most remarkable ever seen here or anywhere else in the United States, and was one of the unique productions of California.

DURING his visit East, Marsden Manson, engineer of the Harbor Commission, will visit Perth Amboy, N. J., for the purpose of thoroughly inspecting the creosote works at that place for the information of the Commissioners. The ravages of the teredo and limnoria necessitate the expenditure of large sums of money annually in repairing wharves, as the insects destroy sound piles within a very few years. A process of inserting a preparation of creosote into the piles is a preventive of the inroads of the little pests, and the Board of Harbor Commissioners look forward to a time when a wharf will stand for a very long time without having its foundation destroyed. Commissioner Alexander says the board has not yet decided to construct works here, but will, in all probability, do so, should Manson's report be favorable. "We want him to learn what the process is and whether we can put works up here with reasonable expectation of success. If we can, we will do it. It will probably cost about \$100,000, but the saving in repairing will be enormous. There is an Act of the Legislature empowering the board to proceed."

SECRETARY WINDOM has made public the exact terms of the lease to the North American

Commercial Co. for a term of 20 years from May 1, 1890, of the exclusive right to engage in the business of taking fur seals off the islands of St. George and St. Paul in the Territory of Alaska and to send a vessel or vessels to said islands for the skins of such seals. The company agrees to pay an annual rental of \$60,000, a tax of \$9 62½ on each skio taken and shipped, and 50 cents for each gallon of oil sold. The company is to deposit United States bonds of \$50,000 face value as security for the rental. It is to furnish to the natives such quantity of dried salmon, salt and salt barrels as the Secretary of the Treasury shall determine, 80 tons of coal annually, comfortable dwellings, to be kept in proper repair, schoolhouses, and competent teachers eight months in each year, a house for religious worship, physicians and medical supplies, and all the necessaries of life for widows and orphans and the aged and infirm. The company is to furnish the natives employment, and to give them just compensation therefor, and hinder itself to abide by the regulations of the Treasury Department and any limitations on the right to kill seals that the Secretary of the Treasury shall judge necessary under the law for the preservation of the seal fisheries. The number to be killed during the first year is not to exceed 60,000. The agents of the company are not to keep, sell, give or dispose of liquors to the Indians.

THIS winter has been a severe one for those loggers and wood-outfitters who have made their homes in the deep woods for the purpose of cutting sawlogs and railroad wood. The *Truckee Republican* says: The severe storms have impeded operations in the line very seriously. A man who, with eight others, has been snowed in at the Truckee Lumber Company's logging-camp, came to town this week. The camp is located in a pretty gulch about nine miles from town, or rather the spot is pretty in the summer-time but now it is filled with snow. Their cabin is completely buried. During the storms, every morning it used to take several hours to dig out. In starting a fire it would be necessary to run a pole up the stovepipe through the snow, so that the smoke could escape. The upper extension of the flue was solid snow, and was several feet long. The snow was so deep that it was very difficult to cut trees. To cut them while standing on top of the snow means a loss of a log at least 16 feet long, containing the best timber in the tree, so that it was necessary to shovel out each tree. The men have got in but ten days' work since the first of December, which is not enough to pay for grub. They will be mighty thankful to have spring come.

THE OLD FORTUNE-MAKER.—What a marvelous piece of property the old Comstock lode is, says the *Virginia City Chronicle*. The daily bullion yield of that lode is fully \$20,000, which will be somewhat increased toward summer, and the yield for the current year will not run far from \$8,000,000. It is deep mining that has made the Comstock what it is, and it has always been claimed by the old miners of Nevada that deep mining would make Colorado properties pay where surface gougering would only result in a loss to those who conducted such operations. The "big bonanza" was found in the 1700 foot level of the California and Consolidated Virginia, and in the space of a few weeks made several Californians many times millionaires. In Colorado 300 or 400 feet is considered a great depth, and the mines that have a greater depth are comparatively few. To successfully work a mine 1000 or more feet deep, requires expensive machinery and heavy capital, but there is every reason to believe deep mining would be attended with quite as much success as it has been in Nevada. It would be interesting to see what one of the great veins of the San Juan or the Aspen district would yield at a depth of 1500 feet, and the time is coming when mining men will have to determine this question.—*Denver Tribune.*

DEEP CROSSCUTS AT BUTTE.—The large silver mines and many other similar ones at Butte, Montana, are crosscutting at their deepest levels, the Alice at the 1200 and the Lexington at what is called the 1500. The East Gray Rock has also completed its shaft to the 500; and the crosscut is in a distance of 100 feet toward the ledge. Mining generally throughout the camp is just only starting on a boom, and in a few months the hills will be dotted with the many leasers and prospectors who are only waiting the coming of warm weather that they may shake off the idleness of winter and get out and rustle.

SMELTERS WANTED.—What is needed in this camp is larger smelters and more of them to dispose of the quantities of ore abounding in the district. Hardly is there a hole sunk without cutting new properties, and none but what contain mineral in paying quantities. Of course on the surface some are found that are not profitable, but give them depth, and in very few instances have they failed to materialize. Years hence this mining district will not be even prospected. Summit Valley mining district is indeed the greatest mining district in the world to-day, and it is only in its infancy.—*Butte Inter-Mountain.*

THE compromise between the Dexter and Elra Companies, at Tascara, Nev., will cause continuance of work in two claims which otherwise would probably have been suspended for several months.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

AMADOR GOLD MINE.—Amador Ledger, March 22: All financial troubles with the miners at the Amador gold mine have been satisfactorily adjusted. All the men who would accept nothing less than the full amount coming to them, were paid off in full on Saturday last. Others who were paid a part, and were willing to wait a few days for the balance, were to be paid all that was due them this week. No work to speak of is being done at the mine; but there is no question it will start in good shape before long. It is the intention of the management to avoid all trouble concerning the wages of employees in future. They will always have sufficient funds in reserve to meet a month's wages. The suit between W. Doyle and the company concerning the track from the mine to the mill has been compromised. The company, we understand, pays the plaintiff \$2000 for permission to allow the track to remain where it now is, merely straightening it near the mill. By this arrangement both sides are satisfied.

DRYTOWN.—The Cosmopolitan mill is at present at a standstill. Contracts were let to run two drifts, each 200 feet in length in the mine. Fred Bochers, Walter Tibbits, Nick Vegas and Henry Dickerman were awarded the contracts. Considerable work is being done at the North Gorge, but somewhat under difficulties on account of the weather and the bad condition of the roads.

SUTTER CREEK.—The new seven-eighths wire rope has been received at the North Star and is already on the sheave. It is 1200 feet long and will permit of sinking 200 feet deeper, which is as far as the management will care to go. Sinking has not commenced as yet, as it is the intention to prospect the 800-foot level before abandoning it, and this will take a week more yet. Operations at the Lincoln, Sutter Creek and South Eureka mines are still retarded on account of the weather. The Wildman is running along in its usual style, and is said to be improving all the time. C. O. Mitchell has secured a contract to make 600 feet of 8-inch pipe to be used as air-pipe at the South Spring Hill mine.

Calaveras.

TULLOCH AND LANE.—Mountain Echo, March 19: We were down to the Tulloch & Lane mine this week, and had an opportunity of seeing for ourselves everything that was to be seen. The mine is looking remarkably well, and carries a splendid quality of sulphurets. The Tulloch Sulphurets Concentrator, invented by James Tulloch of Angels, is concentrating the material from five stamps and can yet do greater work. We unite with the opinion of experts who have examined it and pronounce it the best sulphurets concentrator extant. Its work is effective, positive and final, and its cost is much less than the Frue.

SULPHURETS.—We learn that E. W. Peet of this town has just completed the erection of a sulphurets process, at a point where the Gold Cliff sands empty into Angels creek. This process consists of a large floor covered with canvas, through which flow the water and sands. By the laws of specific gravity, the sulphurets settle in the interstices, where after considerable of a deposit the water is turned off and the concentrations collected. Mr. Peet will also construct a like process below the Tulloch mine.

GOOD MINE.—The Whittle mine, situated some three or four miles southwest of this town, is giving an excellent account of itself. Mr. Peet, the present proprietor, says that he has crushed several hundred tons of the ore with his little mill and none of it yielded less than 59 per ton. The main shaft is over 200 feet deep, and the vein at the bottom ranges from two to three feet in width.

UNION SHAFT MINE.—Prospect, March 22: Another engine has been added to the machinery now in operation at this mine. It is intended, we believe, to use one engine for hoisting purposes and the other as a pump.

LOOMING UP.—The Meteor quartz mine, near Washington ranch, is developing well. One of the owners, Mr. Byroo Swank, is hopeful of an excellent showing in the future.

SMELTING WORKS.—The smelting works at Copopolis will be completed about the first of April. Mr. Person, the Supt., expects to put on about 100 more hands in and around the mine after that time.

Humboldt.

FROM ORLEANS BAR.—Blue Lake Advocate, March 15: From Mr. Ottley, just from there, are learned some interesting facts. He says the long and severe storm has so broken up the mining that there will be but little done this season. The Orleans Bar M. Co. has discharged all the hands, and will work no more this season. Most of the other smaller mines are all broken up. A few small claims are not badly hurt. The floods and landslides have changed the whole face of the country.

Mariposa.

JOSEPHINE.—Mariposa Gazette, March 22: There are rumors of a big mill soon to be built at the Josephine mine, at Bear Valley, with a tramway to the river, and with the usual 100 stamps filling the air with the music that is so sweet to people living in a mining community. What good news it would be if that report should be verified.

DILTZ.—Capt. Diltz and George Stewart are quietly and steadily working away at the Diltz mine. They are uncovering a fine vein, which promises well for a big yield of gold. They also expect good pay from their sluices.

Nevada.

NORTH BANNER.—Grass Valley Union, March 20: Operations at the North Banner mine are going on regularly now, both in the mine and mill. The drain tunnel is running out a big head of water that comes from the surface, but below the tunnel the pump handles the water easily.

STRIKE AT THE WASHINGTON.—Transcript, March 19: Supt. Tregidgo, who is temporarily sojourning in this city, has received a letter stating that on Saturday last a large and rich body of ore had been developed in the 300-foot south drift of the Washington mine at Ormonde, and on Monday the ledge was opened up sufficiently to show it is eight feet thick and carries lots of gold.

PEABODY.—Grass Valley Union, March 22: The

intention was to start up work on the Peabody mine the first of this week, but the stormy weather prevented, but as soon as it is evident that the storms are over, operations will be commenced and carried on regularly. It is the intention of the Nevada County Development and Improvement Co., which has a hood on the property, to put down the shaft 500 feet, and open up levels for the exploitation of the mine, in order to thoroughly develop the property.

DELHI MINE.—Nevada Herald, March 21: On account of the snow, work at the Delhi mine was suspended, except in running the tunnel, some two months since. Supt. Chris Mallon visited there yesterday and says operations will soon be recommenced. Men are now engaged in putting in an air-compressor at the lower tunnel for running the same. The mouth of this tunnel is 80 feet above the river. It will be 1000 feet before the ledge will be struck, and the point reached will be 400 feet vertical depth below the present workings of the mine. It is intended to put the mill below the mouth of this tunnel, down near the banks of the Middle Yuba river. Power for running the compressor will come from the water running out of No. 3 tunnel, which will give 350 feet pressure. The Delhi has a great record, but its past achievements will be nothing as compared with the future, if the ledge is found of the same size and richness below that it has been above, where worked.

San Luis Obispo.

BITUMINOUS ROCK.—San Luis Tribune, March 22: Orders were received Tuesday at the bituminous rock mines, of which Mr. McCormack is superintendent, for 450 tons for immediate shipment, making about 1500 tons forwarded since the season opened. Prospects are good for rapidly increasing business at the mine this spring, with every indication that the statement that the Pacific Coast railway would be unequal to the demands upon it this year, will be more than justified.

Sierra.

GOLD BULLION.—Oroville Mercury, March 21: J. H. Frissell, D. Moore and W. E. Gillon arrived in Oroville from the Union Consolidated drift mine in Sierra county, with \$23,000 in gold bullion, the result of a two-months' run. Last December this mine also made a heavy shipment, and it is paying handsomely. It is worked constantly and employs from 70 to 100 men.

Siskiyou.

GRAVEL AND QUARTZ.—Yreka Journal, March 19: Jillsco & Co., at Henley, are busy uncovering the blue gravel lead, by piping day and night, with an abundance of water in their ditch for the purpose, and will soon be able to realize good pay in washing up the rich bedrock gravel. Thornton Thomas, I. G. Blessing and Mr. Yard struck an extraordinary rich pocket of quartz in Humburg Gulch, just above Yreka Flats, which paid \$200 to a half-day's work of pounding in a mortar. They expect it will pay still richer below the surface croppings and may develop into a permanent lode. We were shown specimens which contained free gold in large quantity, and about the richest we have ever seen from any ledge. Mr. J. W. Yard, one of the finders of the above ledge, called to see us again yesterday, and showed us more specimens secured about a foot beneath the surface, being almost solid gold, with but little quartz. From present indications the ledge opens like pocket seams, although the finders have great faith in its permanency. The ledge is located behind the old Joe Lang cabin, about a mile and a half west of Yreka, in Humburg Gulch, and should it prove a permanent ledge, we may anticipate the finding of several more rich ledges in the entire Humburg range of mountains along the west side of Yreka basin. The Big Ditch is now in good repair and running banks full with water, enabling the miners at Hawkinsville and on Yreka Flats to carry on mining extensively with the greatest success. The prospects of the best times in Yreka since 1855-6 is anticipated, as every paying claim can now be worked to good advantage. Cobb McManus, Royal Brown and others have cleared off considerable top ground from their claim at Spring gulch, just above town, realizing good wages from the surface, while the bedrock gravel remaining when water for ground-sluicing slacks up, will pay very richly with a small head for the sluice-boxes.

SAWYER'S BAR.—Yreka Union, March 20: Down here in a remote, mountainous region in the southern portion of Siskiyou county, there exists a mining field which in the near future is destined to attract considerable attention from the mining fraternity, as there have recently been discovered several quartz mines that deserve more than passing notice, one of which promises to rank among the leading gold producers of the State, and of which little has been learned owing to the reticence of its owners and operators. The Gold Ball Mining Co., of Canton, Ohio. This interesting piece of property is about three miles south of Sawyer's Bar, at the head of Eddy's gulch, which is a tributary of the north fork of Salmon river, and in the Klamath basin. The Gold Ball mine is probably a continuation of the old Klamath vein and its development has shown sufficient to entitle it to be classed among the bonanzas of the State. Work is carried on under the able supervision of Mr. Ball of Canton, Ohio. The Black Bear mine, famous in the early days of quartz mining in California, from the millions it then produced, is on the eve of returning to active operations, and again entering the list of paying gold mines, for which all credit is due Mr. John Daggett, in proving the existence of supposed rich ore chimneys. The Uncle Sam has been a paying property for many years under the management of Mr. Ed Sheffield; it is a large vein of soft decomposed quartz of a good grade, can be mined and milled cheaply and in large quantities, consequently it is a very profitable mine, and in the hands of parties prepared to operate it more extensively would become one of the foremost producers in the county. The Portuguese mine, as it is commonly called, is owned and operated by Rollin Fagundes and his partner; it is a little bonanza in itself, they having purchased it for a nominal sum when but a small insignificant seam of quartz was opened up, which by further development increased into a foot or more of soft decomposed quartz, thoroughly impregnated with the yellow stuff. These two energetic prospectors by their own labor last season produced \$12,000 from 250 tons of rock crushed in an arrastra; this season will show a product double that amount from about the same amount of quartz. The Little Boss mine, discovered last season, is a

parallel vein to and close by the old Klamath; it is small but very rich and promises to yield a small fortune to its owner, Ned Roberts. The Mistletoe, owned by Frank Golden and Tom Evelett, promises to develop into a mine of no small proportions. They have an ore chute of considerable length exposed, showing a width of five feet on an average, from which 40 tons of ore packed to the Black Bear mill last season, for a test, yielded \$22.50 per ton. The Sunday Morning lode, discovered last season by Probasco, Welker and Stent, has been penetrated by tunnel and shaft to a considerable depth, showing a fissure vein of soft decomposed quartz of high grade. These flattering properties, with many others that space will not at present permit of mention, are located near the old placer-mining camp of Sawyer's bar, and promise to open up an inviting field for both prospector and capitalist, especially the prospector, who, with a little muscle and energy to hack him, stands a chance unequalled anywhere in the mining regions of striking a prospect of value which he can develop without the assistance of capital, as the veins are soft and decomposed to a considerable depth, as is also the formation through which they run, with the gold perfectly free in the quartz, and the facilities in the way of wood, water, etc., all that could be desired, allowing one to work his find by the simplest methods, the most essential article being muscle, backed by pluck and energy.

ENCOURAGING.—Yreka Union, March 20: The mining industry appears to be looming up in all parts of the county, the hountiful supply of water making it practicable to work in localities where heretofore it had been impossible. Encouraging reports are being received from the Hooperville, Scott Bar and other regions where mining is the principal industry.

NEVADA.

Washos District.

ALTA.—Virginia Enterprise, March 22: Owing to break in water pipe, the mill was shut down a few days, but work has since been resumed and are crushing about 45 tons daily.

YELLOW JACKET.—Shipping about 65 tons of ore daily of the average value of about \$20 a ton to the Brunswick mill.

CON. IMPERIAL.—West crosscut No. 2 from the 300 level north drift (Yellow Jacket), which is the 500 level of the Imperial, is now out 155 feet, having been advanced 5 feet during the week. The face shows porphyry. West crosscut No. 1 from the 500 level north drift (Yellow Jacket), which is the 750 level of the Imperial, is now out 252 feet, 7 feet having been added during the week. The face is in a mixture of quartz and porphyry. West crosscut No. 2 from the same north drift is out 140 feet, 35 feet having been added during the week. The face of this crosscut is also in quartz and porphyry, and the north lateral drift No. 1 on the same level is in 45 feet, 28 feet having been added during the week. The face shows quartz and porphyry.

CONFIDENCE & CHALLENGE CON.—The joint Confidence & Challenge west crosscut from the 300 level drift has been stopped for the present.

CROWN POINT.—The 100 raise is up 20 feet above the track floor and still shows a streak of good ore in the top. The 300 south slope on the ninth floor has improved somewhat during the week in going south. Shipped to the mill during the week 846 tons of ore, the average battery samples of which were \$17.45 per ton.

BELCHER.—The 200 level south drift from the west crosscut is out 54 feet. The face is in low-grade quartz. The joint 850 crosscut is out 255 feet, and the face is in porphyry and clay. Started a southeast drift from No. 2 crosscut on the 1000 level, which is out 35 feet, or about up to the south line.

OVERMAN.—From the 1200 level have extracted and hoisted 202 tons of ore. Car sample assays average \$16.78 per ton. Of this amount \$10.50 is gold. Shipped to the Vivian mill 319 tons. Battery average \$17.60 per ton, of which \$8.50 is gold. On the 1200 level the northwest drift from the northeast drift has been extended 9 feet through good ore; total length, 52 feet. On the 54-foot level above the 1200 level have extended incline upraise 15 feet through ore of a fair grade. Total length, 49 feet.

POTOSI.—The east crosscut, 300 feet south of north line, 850 level, is out 50 feet; face in porphyry. The raise 400 feet south of the Chollar shaft, 950 level, is up 59 feet. The roof is in quartz giving assays of from \$30 to \$40 a ton.

EXCHEQUER.—The east crosscut on the north line, 500 level, is out 140 feet; face in porphyry.

ALPHA.—West crosscut, 100 feet north of shaft, 500 level, is out 510 feet; face in hard porphyry. North lateral drift, 600 level, is out 180 feet; face in porphyry streaked with quartz.

SILVER HILL.—Northeast crosscut, 260 level, from the northwest drift, 430 feet from the shaft, was driven 20 feet through porphyry; total distance, 595 feet. Repairing northeast crosscut on the 160 level.

SCORPION.—On the 630 level they have started a southwest drift from the shaft station and advanced the same 35 feet.

HALE & NORCROSS.—On the 300 level the north drift was extended 20 feet; total length, 45 feet. The north upraise, 800 level, was advanced 25 feet and connected with the 700 level north drift. This connection improves the ventilation and facilitates the working of this part of the mine. Will soon be ready to extract a great deal of ore from this raise. Have started a southeast drift on the 1300 level to explore the downward continuation of this ore. Milled 800 tons of ore during the week, the average assay of the battery samples of which was \$19 a ton. Have bullion on hand and at the mill amounting to \$17,914.80.

SAVAGE.—On the 300 level the north and south lateral drifts were advanced 8 feet and 17 feet respectively, the total length of the former being 39 feet and of the latter 101 feet. Are extracting ore from the 400, 500 and 600 levels, and from the old stopes on the 750 level. Milled 455 tons of ore during the week, the average assay value of the battery samples of which was \$20.52 per ton. Have bullion on hand and at the mill amounting to \$16,203.20.

ANDES.—During the past week drifted northeast from 10 feet west of shaft, 420 level, 15 feet. Formation, clay and porphyry, with seams of quartz.

Ely District.

NO MINERS WANTED.—White Pine News, March 15: There is yet nothing going on in this

district to warrant an influx of miners or laborers. It is true our own people are busy developing their mines, but they have not the means to employ outside help. Until some organized company starts operations there will be no work for miners or laborers from abroad.

Groom District.

ORE.—Pioche Record, March 15: Groom district is situated about 35 miles southwest of Hiko, or from Pioche about 100 miles in a direction a little south of west. The one developed ledge of Groom runs north and south, dipping east at an angle of about 80 degrees. It lies between lime and slate. A range of quartzite hills runs parallel with the ledge at a distance from it of about half a mile. The ledge croppings are large and prominent, and there were found in them occasional pockets of highly-metallic ore. A chimney containing a considerable body of similar ore was found at a depth of about 100 feet. Five or six hundred tons were taken out and remain on the dump, being too low grade—about 20 oz. per ton silver and 30 to 40 per cent lead—to work without railway facilities for transportation, either of the ore or of its product. Two shafts have been sunk on the ledge, 200 feet apart. One is about 175 feet in depth, and the other, perhaps, 100. These shafts are connected by drifts.

Jackrabbit District.

DAY MINE SOLD.—Pioche Record, March 15: It is reported on good authority that W. S. Godbe has purchased all the property in this county of the Day Silver Mining Co. This embraces the Day and Junction mines in Jackrabbit district, the Mendha and Hamburg mines in Highland district, the Hillside mine in Bristol district, and the old smelter at Bristol. The purchase price was not directly mentioned, but it is said to be \$30,000.

Jumbo District.

PANDORA.—Virginia Chronicle, March 18: The owners of mining locations in Jumbo district will resume the work of development as soon as the road is open for the delivery of supplies. The extraction of ore from the Pandora was continued through the winter months, and there is now a large amount ready for transportation to the Fisher mill in Six mile canyon.

Robinson District.

THE PURCELL MINES.—Eureka Sentinel, March 15: In view of the proposed sale of the mill plant at Seligman, we presume no further efforts will be made to develop the Purcell series of mines unless they change hands. It would be a matter of regret should the property remain idle after so much money has been spent upon it. The vein of the Purcell mines can be definitely traced for miles, and if developed in a systematic manner, the richer chutes of ore be followed and the poorer gangue be left in place to hold up the ground, there is little doubt but the mines can be made to pay. This is the opinion of the better class of miners who have worked in various places on the vein. The big tunnel at the concentrator level is already in 900 feet, and has only 1300 feet farther to run to tap the vein 1750 feet deep. There are Burleighs, compressors and all other necessary equipments on the ground, and should the capital necessary to complete the work be applied for that purpose, there are no visible reasons why the mines should not pay well. The ground in the tunnel is favorable for driving and will probably not cost to exceed \$8 per foot to run it. There is a full water supply at Seligman for all reasonable purposes, and this can no doubt be greatly increased by driving a tunnel through the porphyry under the bed of the southerly branch of the canyon, which, on account of the easy working nature of the ground, can be speedily done at a comparatively trifling cost.

THE MILLING PLANT.—We learn that negotiations are pending between the Kansas Co. with J. N. Hodges at the head and Mrs. Robinson, for the purchase of the Seligman milling plant, with the view of having it removed and put up in this district.

Southeastern District.

MINERAL.—Pioche Record, March 15: Southeastern district is about 15 miles southeast of Groom. In this district may be seen an immense amount of mineral, perhaps more on the surface than in any other portion of this great county. The ore is low grade, not over \$25 to \$30 per ton in silver and 20 per cent lead. It is much stained with green copper. There are two ledges. One of these is clearly traceable for a long distance. One may go along it for 2000 feet and pick up metal from the croppings every 50 feet. It is from 200 to 300 feet wide. There are two places on the other ledge where it widens to 10 feet of ore body, with mineral for 20 feet in width. Both ledges are undeveloped, merely enough work having been done on them to hold them. One of the surveyed railway routes would take a road within a few miles of this district, thus opening perhaps one of the greatest groups of mines ever discovered.

Tuscarora District.

NEVADA QUEEN.—Times-Review, March 20: North gangway from 600-foot station of North Belle Isle has been advanced 32 feet.

GRAND PRIZE.—500-foot level: Face of north crosscut from the west north lateral drift advanced 22 feet.

BELLE ISLE.—The crosscut from the north gangway, 350-foot level, extended 17 feet, cutting through vein matter giving low assays. Face very wet and rock getting harder.

NAVAJO.—South drift from No. 1 crosscut, 350-foot level, extended nine feet in vein giving low assays. No. 2 crosscut, same level, extended five feet, and work there suspended.

NORTH BELLE ISLE.—North gangway from the shaft, 600-foot level, extended 32 feet, showing considerable fair-grade ore in the face.

DEL MONTE.—1st level: Have started north drift, which has been extended 20 feet, cutting seams of high-grade ore. North drift from joint crosscut extended 12 feet, showing high-grade ore mixed through the face. 2d level: Joint east crosscut advanced 15 feet in very favorable looking formation.

NORTH COMMONWEALTH.—1st level: South drift from joint crosscut has been extended 13 feet, exposing high-grade ore as the drift is advanced. No. 2 north drift, from crosscut south of the shaft, has been run 14 feet. In south drift from No. 1 upraise, work has been suspended, and the ore body will be opened up on the level. Ore in the face of drift

rom upraise is looking well, fully six feet wide of first class, 2d level: Joint east crosscut extended 15 feet, through very favorable looking vein matter giving low assays.

COMMONWEALTH.—1st level: East drift from No. 1 north drift extended 14 feet, following the ore, which is opening up well. No. 2 east crosscut has advanced 13 feet, cutting spar seams, and looking favorable. No. 3 east crosscut has been driven 15 feet through the vein giving low assays. 4th level: East crosscut from north gangway extended 20 feet through porphyry, showing some mineral. Have started to crosscut the vein in north drift from south gangway: it is in 17 feet, cutting some very high-grade ore, and looking better than at any time heretofore. The stops in the different parts of the mine all look well, having yielded for the week 750 cars of ore. That crushed at the mill, battery assay \$247 per ton; concentrator \$16.90 per ton—455 tons. Bullion shipped, \$32,068.57. Owing to scarcity of mining timbers, will have to suspend the extraction of ore, temporarily, in certain parts of the mine until the roads get so teams can haul.

ARIZONA.

BIG BUG DISTRICT.—Prescott *Courier*, March 20: The shaft in the Boggs mine is about 240 feet deep; that in the Hackberry about 115. Water is troublesome. Some 40 men are employed. T. W. Boggs has a force of men washing gravel. They have taken out a great deal of gold.

MASSAYAMPA DISTRICT.—The shaft in the Senator is 275 feet deep. Rapid Transit mine is yielding rich gold ore. Harlan's mill is running. W. W. Vanderbilt has succeeded in organizing the Axtell Co. to work his mines in Maple gulch. He starts in with \$250,000 for development work. Company is made up of Iowa and Minnesota capitalists. Quartz Mountain Co. expects soon to put in new machinery. Supt. Furk is shipping gold rock that pays about \$150 to the ton. Concentrators are very much needed. W. J. Mulvenon says that several mine-owners of Turkey Creek district cannot get at the ore on account of water. The galena ledge from which John Reese brought in some ore is said to be 20 feet wide.

COLORADO.

FIELD FOR PROSPECTING.—Georgetown *Courier*, March 20: If prospectors want an easy field and a profitable field for summer prospecting, they can't find a better place than to take Alpine mountain from opposite the Colorado Central, thence across toward the summit of Griffith and thence on along Columbian and Cooper mountains toward Freeland. A few discoveries along here will be nearer market, more readily accessible and more easily brought to the attention of investors than any amount of discoveries in some far-off and almost inaccessible district. From June to January this section should have the careful attention of good prospectors.

THE CALCIUM SMELTER.—Aspen *Times*, March 20: That a smelter is to be built at Calcium this coming summer is now officially confirmed, and work has already been commenced. There is no other question of such vital importance to Aspen as the one of smelting our silver ores. Had Aspen the smelting advantages of Leadville, she would soon take her proper place as the greatest silver camp in the world. However, the rank of our city is but a question of time, for, as development goes on, the amount of low-grade ore, now unmarketable, is constantly increasing. A smelter at Calcium, though not the best location that might be wished for, is bound to afford some relief, for the freight rate on Aspen ores will be reduced from \$8 a ton to \$2. Smelter and mining men have long realized that nothing could be done in the way of building a smelter on this side of the range without the consent of the railroads. There was but one way to go about it and that was to convince the railroads that the establishment of smelters and reduction works in the valleys of the Grand and Roaring Fork would not diminish, but increase their traffic. That the Midland management has at last realized this is apparent from the favorable concessions they have made to the projectors of this new enterprise. The controlling spirit of the project is J. L. Thomas. C. C. Morgan is the manager of the new works and from him the reporter got his information. He will soon have room at work on the new plant and the smelter will be ready to receive ores by July 1st. Its cost will be \$200,000, and it will have a capacity of 100 tons a day. There is an abundance of good lime rock almost at the very door of the new works. There are thousands of tons of low-grade ore containing much iron in the Frying Pan belt. Only a few miles from Calcium, on Porphyry mountain, the Deane and Argenta groups are showing fine lead ores.

AN IMPORTANT PURCHASE.—The Continental Divide Mining Investment Co. has just closed the purchase of 25 1/2-100ths of the lease and bond on the Bushwhacker and Alpine mines from John T. Prather, Isaac Jones, L. S. Taylor, John Burdell, C. M. Sain, Mrs. J. T. Stewart, James Gould and Ed Grover. This makes that company and the Aspen Consolidated Co. the holders of over 90 per cent. On Saturday, the Continental Co. will make another payment on the bond. Forty men are employed on the property.

DAKOTA.

HYDRAULIC MINING.—Cor. Deadwood *Pioneer*, March 20: We think that the well-informed miner will corroborate the writer's statement that in the Black Hills there are acres of auriferous gravel deposits, on Rapid, Little Rapid, Castle and Battle creeks, in the southern hills. Beaver, Lower Bear and the deeper deposits of Whitewood are practically untouched yet, that will yield not less than 35 cents per yard, and that is a very low estimate with plenty of ground and water and dumping facilities. Hydraulic mining can be made profitable with less than 35 cents per yard; in very few instances has the bedrock been prospected in the water course or creek beds proper; and so far as the writer can ascertain, every instance where bedrock has been prospected, it has given results that are highly favorable. Let the reader bear in mind that on these creeks to which we refer it is 15, 20 or perhaps 30 feet to bedrock; abundance of water on the surface, and on the bedrock the seepage is

so great as to necessitate expensive pumping machinery. Men who are able to put in pumps and machinery, and hire men to do the work of drifting and timbering, generally find it unprofitable. In the hills a number of hydraulic mining companies have been formed and good conveying ditches built, and owing to the fact that the bars furnish the better dumping facilities, hydraulic mining has been almost entirely confined to the bars of the creeks. Some of them have paid handsome returns. There are many places which could be made to pay by means of the hydraulic gravel elevator so commonly in use in California.

IDAHO.

SAWTOOTH.—Ketchum *Keystone*, March 15: We are in receipt of information that the Silver King M. Co. expects to resume work on the Silver King mine as early as practicable in the spring. There is a rumor to the effect that the Silver King M. Co. has entered into a consolidation with other companies controlling mining interests at Sawtooth, but whether there is any foundation for this rumor we are unable to say. If such should be the case, however, the Columbia Co.'s quartz-mill at Sawtooth will, no doubt, be operated during the season.

THE QUEEN OF THE WEST.—Elmore *Bulletin*, March 19: By persistent work under many disadvantages Messrs. Pearson, Adams and Alexon have opened a good mine in their Queen of the West location, a short distance above the great Elmore mining property. They have run the main tunnel along the ledge for a distance of 300 feet and have struck at a depth of 110 feet from the surface, the same chimney or ore body the surface rock from which panned out so handsomely by working process at Reeser's mill last summer. The tunnel for a distance of 200 feet is in good ore, but it does not compare in richness to the big body of free-milling gold quartz they struck a few days ago. The ledge is five feet wide, with well-defined casings and walls, and it is now demonstrated beyond a doubt that it increases in size and richness as depth is attained. A streak of 30 inches of the ledge is very rich in gold and if assorted would pay immensely, but the whole vein from wall to wall could be mined and milled at a big profit.

ELKHORN.—Idaho *World*, March 18: Jess Bradford, foreman of the Elkhorn, and Ed Clark, at work in the mine, came down from there the other day. Jess says the raise, 600 feet from the mouth of the lower tunnel, is now up 256 feet, and is within about 75 feet of the old works of the mine where so much high-grade ore was turned out in the sixties. The raise has gone through some fine ore, but in carrying on this work they have not taken the time to thoroughly prospect the vein. Another raise is going up from a side drift run from the main tunnel 400 feet from the mouth, and they are also prospecting for the chute from which Hugh Turner, in a few weeks, took out \$30,000 from a level above.

AT THE RED CLOUD.—Wood River *Times*, March 20: Ten men have been put to work at the Red Cloud mine during the past few days; and as soon as the tunnel on the 500-level is sufficiently advanced to admit of another tunnel being commenced at a depth of 600 feet, ten more men will be put on. This will make about 30 men at work there, and may be the maximum number which the Co. will employ this year, as this is about as many as can be worked to advantage until more openings are made in the mine. It is the intention of the management to drive a tunnel at every 100 feet of descent, until such depth is attained that it will be cheaper to sink a vertical shaft than work through tunnels. This may not, however, be for years. As there is no particular hurry about it, no large shipments of ore will be made from the property until some time in May. Then, if the ore rates are satisfactory, the production may run up to a carload a day. The property is already opened sufficiently to admit of this; but the management is in no particular hurry about it, as all it wants is a fair return on the investment. Since the company took hold, quite an important development has been made. The face of the tunnel on the 500 level showed 22 inches of ore when the mine changed hands, but since then the ore in the header has widened to three feet. By one shot in the breast, six tons of first-class ore were knocked down.

MONTANA.

ARGENTA DISTRICT.—Cor. Butte *Inter-Mountain*, March 18: In the Argenta district a very confident feeling prevails among those best posted on the resources of the camp that the coming season will place them in a prosperous condition, and that their production and shipments of lead-silver bullion with enough gold in it to make it a matter of interest, will be of sufficient magnitude to attract capital to properly develop and show up their properties. The P. J. Kelly Co. has been merged into the Argenta Mining Co. and the new capital enlisted in this company has already paid off the indebtedness incurred by the old organization.

THE BALD MOUNTAIN DISTRICT.—On the Bull and Dillon lodes McIntosh & Co. have developed some fine gold and copper ores and their prospect is really flattering. A syndicate of Washington, D. C., capitalists have acquired some properties here and are, in a quiet way, developing them with a small force of men, and appear to be well satisfied with their purchase.

THE MAGNET GROUP.—Some Butte capitalists are interested here and work is being prosecuted on their tunnels by a full force all the time, under the management of W. R. Pearson.

THE ELKHORN DISTRICT.—The Critic M. Co. completed their mill last fall, but owing to the altitude and consequent severity of the weather, have not been operating it. The work done before closing on account of the snow was very satisfactory. They can treat nine tons in 24 hours, amalgamating by the barrel process and saving a high per cent of the ore value. They have a large supply of ore out ready to start the mill as soon as the weather will permit. The San Francisco Co. on the Storm and Simpson mines are keeping the water out and L. C. Fyhrle is down making arrangements to continue developments on the property. The principal drawback to the development of this camp is the extreme cold, as it lies over 8000 feet above the sea level.

THE GLEN DISTRICT.—Dr. J. S. Meade and Stanfield have been developing a mine called the Yellow Jacket about five miles across the Big Hole

river from Ulen station. They have two tunnels in on the vein, one 75 feet and the other 45, and have from 8 to 12 inches of a fine chloride ore carrying from 150 to over 500 ounces silver. Both gentlemen are highly elated over their new find.

NEW MEXICO.

GREAT WORK.—Southwest *Sentinel*, March 18: M. W. Neff shipped 40 tons of Little Fanny ore to Denver on Saturday. The Pacific Gold Co. is shipping two carloads of concentrates to Pueblo daily. Mr. Newcomb has resumed the shipment of iron ore to the Socorro smelter. He now employs 45 men at his mill and mine. R. L. Powell is taking out some very rich ore at his property on Walnut creek, and will soon make a shipment. Negotiations for the sale of the Maud S. mine are still pending, and it is understood that the owners have agreed to sell provided the conditions of the sale are complied with on or before the 1st of April next. Mr. Kilgour of Cooney, one of the owners of the Champion mine on Silver creek, was found dead in his cabin a few days ago. His relatives reside in Grass Valley, Cal. The Champion is considered one of the best mines in the Mogollon country.

THE ZINC MINES IN HANOVER.—John Brockman and others have bonded a group of zinc mines in Hanover, belonging to W. Z. Redding, Mrs. John Black, A. Marlin, Peter Mangal, and others. Twenty miners have been employed and a number of teams have been engaged to haul the ore to this place, whence it will be shipped to Mineral Point, Wis., for treatment. M. W. Neff is steadily operating his zinc mines in this district, and says he is making a fair profit on his shipments. He has purchased the interest of his partner, John Irwin, and is now sole owner of the mine.

UTAH.

VENUS.—Eureka *Chief*, March 20: Jas. H. Lawson and Johnnie Hunt discovered a large body of ore on their claim, the Venus, this week, in the mountains beyond Homansville, about 2 1/2 miles east of Eureka. An assay was made of the ore and Mr. Lawson informs us that it goes 15 ozs. silver, 18 per cent lead and 55 in gold. This is pretty rich for surface ore and it will doubtless grow richer as depth is attained. The boys feel sure that they have a good thing. There was quite a rush of prospectors to that vicinity, and the ground adjacent to the Venus was all taken up in short order.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING MARCH 18, 1890.

- 423,429.—DEVICE FOR TAPPING SHEET-METAL VESSELS.—C. H. SPINKS, Oakland, Cal.
- 423,778.—LAWN SPRINKLER.—A. A. Kent, San Jose, Cal.
- 423,618.—ADJUSTABLE GROOVING HEAD.—Matthews & Quinlan, Oakland, Cal.
- 423,631.—OIL-CAN HOLDER.—H. Reno, Portland, Ogn.
- 423,447.—METAL RAILWAY TIE.—P. W. Ross, Los Angeles, Cal.
- 423,633.—FENCE POST.—Saxon & James, Colfax, Wash.
- 423,832.—ORE-CRUSHING MILL.—W. C. Stiles, S. F.
- 423,504.—SWINGING GATE.—M. B. Wible, Arcata, Cal.

The following brief list by telegraph, for March 25, will appear more complete on receipt of mail advices:

California.—Samuel Bauman, Santa Cruz, ticket-holder for marking goods; Henry O. Beatty, Sacramento, steam motor for pumps; John R. Brett, Oakland, feed-rod for ore-stamp mills; Walter Bullard, Chico, hallog press; Walter M. Cary, S. F., street-railway car truck; Marcus Dattlebaum, S. F., umbrella attachment; Frank A. Fox, S. F., car coupling; Frank L. Hughes, Arcata, ax head; David D. Jones, Santa Clara, fruit-grader; John Keane, S. F., wind guard; John G. Kitton, assignor of half-interest to W. T. Garratt, S. F., machine; Albert McDowell, assignor of half-interest to J. A. Stroud, Selma, Napa, Nisson, Sacramento, fender for feed-cooler; Charles H. Olm, S. F., railway switch; Neil K. Pearson, S. F., brake shoe; Albert H. Richardson, S. F., machine for sharpening cutting tools; Frederick A. Robbins, S. F., machine for crimping the heads of metal cans.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Bullion Shipments.

We quote shipments since our last and shall be pleased to receive further reports:

Cons. California and Virginia, March 26, \$64,515; total to date for March, \$78,813; Hanauer, 19, \$2650; Ontario, 19, \$21,821; Hanauer, 20, \$6150; Justice, 22, \$4574; Commonwealth, 24, \$16,000.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging efforts. We intend to send none but worthy men.

J. C. HOAG—San Francisco.
R. Q. RAILY—San Francisco.
E. B. BUCKMAN—Santa Cruz Co.
SAMUEL CLIFF—San Luis Obispo Co.
C. J. WADE—San Bernardino Co.
W. W. THORNTON—Los Angeles Co.
E. H. SCHARFF—Calaveras Co.
FRANK S. CHAPIN—Colusa Co.
ISAAC AYER—Fresno, Cal.
HERBERT CARPENTER—Fresno Co., Cal.
W. B. FROST—Humboldt Co.
GEO. WILSON—Sacramento Co.
T. M. STACRUS—Sierra Co.
H. KELLEY—Modoc Co.
W. H. HILLARY—Oregon.
E. E. DENING—Oregon.
CHAS. M. MOODY—Oregon.
H. G. PARSONS—Washington.
T. J. MAY—Washington.
R. G. HURON—Montana.

Mining Share Market.

The past week showed continued activity in Chollar and Potosi shares, with the latter in the lead. The movement has been sharp and decisive. So far as we can learn, the general public have no faith in the proposition, neither do experienced miners speak any too hopeful, yet they qualify their remarks by saying that it is a gamble, for present prospects may prove by work more valuable than now thought. To an outsider it looks as if the manipulators have shorts on the stock who they are determined to make fill, after which peddle out the shares. This has always been the case heretofore. The Potosi mine at to-day's (Thursday) quotations is selling at about \$500,000, which is a very good price. Yet the shares may sell higher before there is a decided break. In the other stocks there has been only a slight upward movement in sympathy with the advance in Potosi. In the Tuscaroras and other outside mining shares, trading has been light, attention being drawn to the middle group of the Comstock mines.

In another department of to-day's paper there appears a communication from an experienced practical miner on the present situation on the Comstock lode.

Several mining men are to leave to-morrow or Saturday for Virginia City to examine the Potosi and Chollar mines. In our next week's issue, we will be able to give the result of their investigation.

From the Comstock mines, while reliable private advices continue scarce, yet a few items begin to leak out, which give a fair idea on what the present movements in stocks are grounded.

The upraise in Potosi is up from the 930-foot level, 65 feet, and is in 3 feet of ore assaying from \$35 to \$45 a ton. On the same level a winze is being sunk on the same ore, which at last advices had widened to 4 feet, assaying from \$30 to \$50 a ton. A drift from the Ward Shaft is being pushed west to get beneath the ore found in Potosi. In Chollar they are preparing to start several crosscuts next week in the ledge now being opened up in Potosi. Advices from Hale and Norcross report that work was suspended owing to a flow of water, but this is about over now, and work is to be resumed. At the date of stopping work a 6-foot vein of \$40 to \$65 ore was cut on the 1200-foot level, which widened to 9 feet on the 1250-foot level. On the 1300-foot level a drift is being run to tap the downward continuation of the ore. If it widens at the same rate as it did from the 1200 to the 1250-foot level, it ought to be quite a good sized body of ore on the last named level. In Overman, on the 1200-foot level a body of good ore is being developed.

From the Tuscaroras, private information that is reliable is hard to get. Mr. Hyman, who has just returned from the district, speaks in glowing terms of the situation, yet the shares of the mines listed on the stock boards act as if they were very "sick." From the Quijotas our advices are favorable, as are they from the Mt. Diablo mine. From the Bodie district our advices are still more favorable. Stringers and streaks continue to come in in Bodie, and the more favorable are followed with the hope of finding something of value. Those in position to know are very hopeful over the present situation. Work is being done in all the levels from the 800 up to the 400 foot level.

Potosi was assessed to-day 50 cents per share.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, department 10, San Francisco:

D'OPALE COSMETIQUE COMPAGNIE, March 21. Object, to manufacture opaline and other toilet articles. Capital stock, \$5000. Directors—A. W. Hinton, L. M. Kand, W. Blaisdell, C. J. Blaisdell and S. V. Harris.

HOME INVESTMENT ASSOCIATION, March 21. Object, to deal in real estate and loan money. Capital stock, \$1,000,000. Directors—Jeremiah F. Sullivan, Jas. H. Barry, Frank T. Shay, John C. Bateman, Wm. H. Gagan, Charles T. Stanley, John Galloway, Edward J. Casey and William F. Welch.

STAR BOWKETT LAND AND BUILDING ASSOCIATION. The Directors are John M. Days, Edward Oliver, Wm. F. Floyd, Wm. Clark, F. D. Branden, H. V. Hutton, W. H. Fuller, Peter F. Hollings and Hy G. Jackson.

MENDOCINO COUNTY REOWOOO ASSOCIATION. Capital stock, \$500,000. Directors—Franklin Heywood, Samuel Blair, J. G. Jackson, E. J. Dodge of Alameda, C. E. White, E. C. Williams and L. E. White of Oakland, and Henry Wetherbee and Robt G. Bixbee of Fruitvale.

SUMNER FANNING CO. Capital stock, \$200,000. Directors—Frank W. Sumner, Chas. Stewart, Jas. Stevenson, M. P. Brown and Wm. Baillie.

ROBERTS PRINTING CO. March 22. Capital stock, \$25,000. Directors—John W. Roberts, E. K. Roberts, W. L. Seward, Wm. H. Hyde Jr., H. L. Kear.

CINCINNATI M. Co., March 25. Location, Tombstone, A. T. Capital stock, \$10,000,000. Directors—A. F. McGrew, W. B. Reynolds, F. Tagliabue, N. B. Lazard and W. Gambis.

BELVIDERE IMPROVEMENT CO., March 26. Object, to deal in lands, railroads, vessels, water rights, buildings, franchises, etc. Capital stock, \$500,000. Directors—Fred S. Wilson, H. N. McChesney, A. G. Pratt, Henry Thompson and Frank P. Pray.

JOOOE HOGE has signed the findings in the case of Archie Borland against the Nevada Bank. The judgment is for \$71,469.54 in favor of Mr. Borland's estate. The indebtedness grew out of mining and water-right speculation in the Black Hills country several years ago.

THE franchise to the Pacific Telephone and Telegraph Co. to lay underground conduits to the city has been granted by the Supervisors, notwithstanding the Mayor's veto.

SMARTSVILLE, Yuba county, is having an old-time boom; about 150 men are employed in the mines there.

MECHANICAL PROGRESS.

Notes on the Working of Steel.

1. Good soft heat is safe to use if steel be immediately and thoroughly worked. It is a fact that good steel will endure more pounding than any iron.

2. If steel be left long in the fire it will lose its steely nature and grain and partake of the nature of cast iron.

Steel should never be kept hot any longer than is necessary for the work to be done.

3. Steel is entirely mercenary under the action of heat, and a careful study of the tables will show that there must of necessity be an injurious internal strain created whenever two or more parts of the same piece are subjected to different temperatures.

4. It follows that when steel has been subjected to heat not absolutely uniform over the whole mass, careful annealing should be resorted to.

5. As the change of volume due to a degree of heat increases directly and rapidly with the quantity of carbon present, therefore high steel is more liable to dangerous internal strain than low steel, and great care should be exercised in the use of high steel.

6. Hot steel should always be put in a perfectly dry place of even temperature while cooling. A wet place in the floor might be efficient to cause serious injury.

7. Never let any one fool you with the statement that his steel possesses a peculiar property which enables it to be "restored" after being "burned;" no more should you waste any money on nostrums for restoring burned steel.

We have shown how to restore "overheated" steel.

For "burned" steel, which is oxidized steel, there is only one way of restoration, and that is through the knobbling fire or the blast furnace.

"Overheating" and "restoring" should only be allowable for purposes of experiment. The process is one of disintegration and is always injurious.

8. Be careful not to overdo the annealing process; if carried too far it does great harm, and it is one of the commonest modes of destruction which the steel-maker meets in his daily troubles.

It is hard to induce the average worker in steel to believe that very little annealing is necessary, and that a very little is really more efficacious than a great deal.—*Exchange.*

Steel Ties Successfully Tested.

Some of the "Standard" steel ties have been in service on a quarter of a mile of the Chicago & Western Indiana railroad about four months. The ties are of channel section, with a block of compressed, preserved wood (on end grain) under each rail. Concerning the results thus far reached, Mr. J. W. Clark, roadmaster of the Chicago & Western Indiana railroad and the B. & O. railway of Chicago, says: "These ties were laid October 1, 1889. They were put in at the above location on south-bound track, for the reason that at this point the ballast is very light gravel, which would make the test much more severe than if they had been put in at another location of the road. The traffic on this section is 80 regular trains in one direction every 24 hours. The heaviest engine weighs 98,000 pounds, with 15,000 pounds on each pair of drivers. So far the ties have given perfect satisfaction, requiring but slight attention, and that only when first laid. There are no loose bolts, clips or nuts. It would be impossible for me to estimate correctly, at the present time, the saving in maintenance, as the only thing to need attention is the bolts and clips, and so far they have shown no indication of weakness in any particular. There has been no upheaval of the ties where the ground is frozen, and from present indications I hardly believe that such will occur. The ties are in good line and surface, and hold the rails in an upright, rigid position, so that the wear on the rail-head seems to be more uniform and even than where wooden ties are used. I am free to say that the ties have so far surpassed all my expectations. There seems to be no possibility of spreading of the rails. Should a rail break, there would be less liability to accident, for the reason that the fastenings hold the rail absolutely firm and rigid. I believe that the saving in maintenance that will eventually be shown, and the absolutely safe, permanent way which these ties make, to say nothing of their greater life, will show greatly in their favor."

To BUILD STEEL CARS.—The fact that this is the age of steel, says an exchange, is emphasized by the announcement of the birth of another town, the purchase of half a million dollars worth of acre property, and the perfection of a practical idea that will revolutionize railroad travel. The project is the manufacture of steel railway cars, which, although not a new thing by any means, has not yet been largely entered upon. The site of the new town is within the corporate limits of Chicago, embraces 700 acres, and in point of manufacturing importance promises to become a second Pullman. Plans are already drawn up for works covering ten acres, near the intersection of Grand Trunk and Illinois Central railroads. The main purpose of the company is the construction of an absolutely fire-proof steel car,

These cars will not have any wood in their composition, and will be wholly of steel or other non-combustible material. The steel used, known as Kalamein, is impervious to rust, susceptible to the highest polish, and not liable to contraction or expansion under varying degrees of temperature. The new car has received the indorsement of experts in car-building, the model now in use being a first-class postoffice car, built on plans approved by the Postoffice Department, and fitted up with all the latest improvements. We presume that the works above described are for putting into practical use the invention of a well-known resident of San Francisco.

MANUFACTURE OF RED GLASS.—The secret of the manufacture of red glass for church windows—12th and 13th centuries—was, according to a paper by C. E. Guignet and L. Magne, only recovered by Bouteims in 1826, who showed that the red color was due to the presence of cuprous oxide. The modern manufacture, however, is not equal to that of early times. The author—*Journal of the Society of Chemical Industry*—shows that the glass of the 12th and 13th centuries may be divided into three main classes: (1) Glass veined on the surface. These markings are only on the one surface, and have been produced during the blowing by the spreading out and flattening of the glass, due to centrifugal force, at the end of the blowpipe. (2) Glass colored in the middle. This was obtained by fusing a very thin layer of red glass between two colorless surfaces. The effect is much finer than that obtained by the present method of flashing, i. e., having the colored glass outside and the colorless within. (3) Glass marbled in its substance. This was of two kinds. In one case the markings were bent, twisted and turned back on themselves in no sort of order, while in the other the colors occurred in exceedingly thin layers always parallel to one another, and the whole way in outline. The color is made up of different shades of red, and the veining is only red on the surface. They have been produced by glass of a yellowish tint arising from the presence of protoxide of iron coming in contact with the greenish-blue glass, due to cuprio oxide.

STEEL TRUSSES FOR MASTS.—There is no problem of greater interest to shipbuilders and owners along the Atlantic Coast just now than that of devising a safe and otherwise satisfactory rig for the big four-masted schooners that have become so fashionable within the past three or four years. Instead of the long, thick, heavy spar rising from the midship line, it is proposed to substitute two neat, substantial steel trusses. The trusses are to be built of three or four pieces of flat steel set edgewise to the side of the ship, and united by angle irons riveted between them and by tie rods, which would make the truss at once light, stiff and symmetrical. Where the trusses meet at the cross-trees, they would be riveted to a stiff steel cylinder, in which the topmast would be stepped. From the heel of this topmast, or from the steel cylinder in which it was stepped, would be stretched a steel rope, the lower end of which would be set up in a stout eye-bolt set into a deck beam. The sail could be secured to this perpendicular stay by clips, just as the yacht jibs are secured to a j-bstay. The boom and gaff would swing on metal collars put around the rope. The sail would swing to and fro as readily as it now does. The steel rope on which it swung, if of proper size, would stand a much greater strain than any wooden mast. Further, to strengthen the trusses that at once replace masts and shrouds, cross-plates and tie-rods could be run from truss to truss, but if the truss-plates were made of suitable size, and the size could be easily calculated, these long tie-rods would not be necessary.

SOMETHING NEW IN STEAM-ENGINE FOUNDATIONS.—Among the remarkable examples of bold engineering in the great sugar refinery of Claus Spreckels, of Philadelphia, Pa., one of the most unique is the hanging or aerial steam-engine foundations. The engines used in this establishment are distributed practically all over the buildings, a large proportion of them being on upper floors. Some of these engines are bolted to iron beams or girders on second and third stories of the building, and are consequently innocent of all foundation. Some of these engines run noiselessly and satisfactorily, while others produced more or less vibration and rattle. To correct the latter, the engineers simply suspended foundations from the bottoms of the engines, so that, in looking at them from the lower floors, they were literally hanging in the air. A foundation does service to an engine, or any machinery, it seems, by its weight alone; hence it makes little difference whether the foundation be firmly imbedded in mother earth or in the air.

CEMENTING AS A SUBSTITUTE FOR WELDING.—By a new method of cementing iron, the parts cemented are so effectually joined as to resist the blow even of a sledge-hammer. The cement is composed of equal parts of sulphur and white lead, with a proportion of about one-sixth of borax. When the composition is to be applied, it is wet with strong sulphuric acid, and a thin layer of it is placed between the two pieces of iron, which are at once pressed together. In five days it will be perfectly dry, all traces of the cement having vanished, and the work having every appearance of welding.

SCIENTIFIC PROGRESS.

THE TONGUE OF A SNAIL.—The month of the snail is armed with a very formidable instrument in the shape of a remarkable saw-like tongue which slices off leaves like a knife. Probably you have, at some time or another, noticed how cleanly cut are the edges of a leaf upon which a snail has been regaling himself. It is difficult to imagine how such a soft and flabby-looking animal can have made such clean incisions. But with an examination of the cutting instrument concealed in his month, wonder on this score vanishes. It resembles a long, narrow ribbon, coiled in snob a manner that only a small portion of it is called into use at once. Thickly distributed over the entire surface of this ribbon are an immense number of excessively sharp little teeth, designed in a manner which admirably adapts them to the purpose for which they are intended. The number of these teeth is incredible—one species, for instance, has been indisputably proved to possess as many as 30,000 of them. The reason for their disposition on a coiled, ribbon-like surface lies in the fact that by use they become worn away. As this happens, the ribbon is uncoiled, and the teeth, which before were wrapped up in it at the back of the snail's mouth, come forward to take the place of those which have served their turn. The upper part of the mouth consists of a horny surface against which the sharp-toothed tongue works. A leaf which is to be operated upon is caught between the two and subjected to a regular file-like rasping on the part of the tongue. So effective an instrument does this form that the tough leaves of the lily may often be found to be entirely rasped off by it.—*Longman's Magazine.*

STANDARD OF LENGTH.—In the United States and England, the standard of length is the yard; and the question arises, How long is a yard? It may be said in answer that a yard is simply an arbitrary standard which tradition says is based upon the length of the arm of Henry VIII. At present the yard is the distance between the two marks upon a certain bar, kept in the Tower of London, and if it should be destroyed, the exact standard could never be replaced. To avoid this uncertainty, and obtain a fixed and unvarying standard, the French, in the last century, made an accurate measurement of a quadrant of the earth's circumference, and taking the ten-millionth part of this distance, gave it the name of meter, and adopted it as the standard of length. The length, which is equal to about 39.37 inches, is now in universal use on the continent of Europe, and is authorized as a legal standard in nearly all countries. Considerable discussion has arisen as to whether the original measurement was perfectly accurate, and it seems probable that there was a small error, so that if the standard meter now kept in Paris should be destroyed, a remeasurement of the quadrant of the earth would not give us exactly the same meter. However, the error in any case is a very minute one, and the chances are very small that the original standard will ever be destroyed, to say nothing of the fact that the numerous copies distributed among the various nations of the world do not appreciably differ from it.—*Popular Science News.*

AN OXYGEN EXPLOSION.—An accident which occurred in Lexington, Ill., gives sad emphasis to the necessity for care in conducting chemical experiments. Professor J. Jess, of the high school, started to make oxygen for his chemical class. He used as a retort a piece of gas pipe eight inches long and two inches in diameter. On applying heat for a short time an explosion occurred and the retort blew up like a bomb-shell. The room was wrecked, Professor Jess and several others were terribly injured, while about twenty were included in the list of wounded. The probabilities are that the chemicals were impure. About twenty years ago a similar accident happened at the School of Mines, Columbia College. The experimenter had by mistake mixed sulphide of antimony, instead of binoxide of manganese, with chlorate of potash. On applying heat the mixture in the retort exploded and the experimenter's sight was permanently destroyed. Oxygen can with perfect safety be generated in a glass retort, flask, or test tube, but the mixture of chemicals should always be tested by heating a small quantity in the bottom of a test tube. If it evolves oxygen quietly, the oxygen mixture may be considered correctly made. Sulphide of antimony and binoxide of manganese are so similar in appearance that the mistake described above is one always liable to happen, and the result is practically gunpowder or worse. Organic matter or sulphur may bring about a similar result.

SOLVENT POWER OF A LIQUID.—A very simple experiment may be performed to show the solvent power of a liquid, namely, by taking a small vial of camphor water or a quantity of alcohol with as much camphor dissolved as it will hold, and then adding to this a drop of water; it is as clear as water itself until the drop is added, when the solution is weakened so much that it cannot hold the camphor longer in solution and begins to give it up in a white cloud, allowing it to rain down to the bottom of a glass. About the same process as this is effective when a specimen of drinking water is to be examined for a test of organic matter which it

may contain in solution. The solvent power for this impurity is reduced by giving the liquid something better to dissolve, or something to dissolve for which it has a greater liking, sugar being one of the best known substances in this respect; thus when a spoonful is added to a flask and corked up tight in the sunlight, the water drops the organic matter and adopts the ingredient it has a greater affinity for—all that is required being to watch for the minute black specks which will be seen floating in every portion of the liquid when water for drinking purposes is to be tested for purity.—*Ec.*

GUNS FOR FOG SIGNALING.—Guns have for some years been used with satisfactory results for fog-signaling on the Swedish coast. Their signals have been heard as far as 12 nautical miles. A new gun has just been manufactured and stationed at Hohné Gadd in Sweden, made of best wrought Sandviken Bessemer steel by the Stafsjo Engineering Company. It is ten feet long and the caliber is 60 millimeters. The breech-loading mechanism allows of firing from 20 to 30 shots per minute. It will thus be possible to fire letters according to the Morse alphabet, one shot being a dot, and two shots close together a dash. Of this system of signaling more may be heard by and by. The breech-loading mechanism can be taken out and to pieces in less than a minute, and without the use of any tools, and also put together without any. The cartridges can be used from 100 to 300 times. The gun rests on a gun carriage of wood, and is placed in a small wooden shed, the barrel projecting through a hole in the wall. The shed or house is very conveniently arranged for the men, with accommodation for refilling the cartridges, etc. The gun, with 130 brass cartridges, spare parts and ammunition for 10,000 shots, has only cost \$1375. The gun can probably stand some 40,000 shots; so the cost for a shot, exclusive of power, will be only about two cents.

DISCOVERY OF PLATINUM AND NICKEL.—A discovery that may be truly described as wonderful in its probable results, says the Canadian correspondent of a contemporary, has been made at Sudbury, Ontario. Copper mines have been worked there for a good while and platinum is found in the same mines, but the metal nickel is also found there in an enormous quantity, so great that it is said one month's output would supply a year's demand from all parts of the world. But this is not all; in preparation of the alloys it is found that certain proportions of nickel and steel produce a compound with characteristics that will in all probability revolutionize the steel interest. Nickel is not an expensive metal, and this compound of nickel and steel can be produced at a far less cost than best Bessemer steel, while it is not only suitable for every use to which that metal is applied, but is very superior to it.

THE IMPORTANCE OF MINUTES.—Boston people seem to have a somewhat exaggerated value of the importance of minutes in traveling. They want shorter time for the run between that city and New York, and the subject has been brought before a legislative committee. It was claimed by one of the representatives that the railways could if they were disposed shorten the present time of six hours between the two cities by from 27 to 35 minutes, which, while it may be true, would hardly seem to justify legislative action. The power of legislatures to fix the rates which railway companies may charge for their service is established, but their right to compel the running of trains at a faster speed than the managers consider prudent or advisable may still be open to question.

IMPORTANT DISCOVERY.—An important discovery has been made by Col. Richmond Hibbard of Camden, it being a manganese mineral pigment. He has been making practical tests for several months. Inexhaustible quantities of the mineral are found in various parts of the country. In this locality it runs in seams of six feet in thickness. The cap and base of the seam of manganese block is an isoprey, which, mixed with the manganese, makes the finest of fire-proofing.

THE FAST FISHES, according to Prof. G. B. Goode, are of pointed build with close-lying fins, and are frequently predaceous. Food fishes, on the other hand, are often slow, and easily caught, but are correspondingly prolific. The actual speed of fishes is not as yet well known; but as dolphins have been observed to swim round and round a steamer going at full speed, their speed is estimated at 20 miles an hour or more.

LACK OF SYMMETRY IN THE EYES.—When the average man or woman comes to be fitted with the first pair of glasses, some curious discoveries are made. Seven out of ten have stronger sight in one eye than the other. In two cases out of five one eye is out of line. Nearly one-half the people are color-blind to some extent, and only one pair of eyes out of every 15 are all right in all respects.

A PETRIED TREE was found recently in a coal mine at Osnabruck, Germany. The trunk is almost four feet through, and the roots cover a surface about 15 feet square. The tree has been set up in a special room in the Berlin School of Mines.

GOOD HEALTH.

MORTALITY AMONG RAILWAY EMPLOYEES.—During the past year, by the report of the New York Railroad Commission, 119 employees were killed and 712 were injured. The commission advises that a law be made requiring railings around the roofs of freight cars over which brakemen are often obliged to walk. In icy weather many slip off, and frequent fatal accidents thus occur which a little forethought would have prevented. Another recommendation is that no new railroad be built without the consent of the commission. This is to prevent the duplicating of railroads that would unnecessarily compete with each other. But who shall decide when such competition is unnecessary? At present this decision is left with the State Legislature, which must charter the new road before it can begin to do business. If railroads were not run to make extortionate profits, there would be less likelihood of competing lines. A law of New York authorizes the State to take possession of railroads that earn more than ten per cent on their capital stock. To avoid this, most of the roads are capitalized for much more than their cost. If they pay large profits on this watered stock, there is constant temptation to capital to invest in new roads built more cheaply and capitalized for much smaller amounts. When men in other business act thus foolishly, they are left to suffer, and the public reaps the benefit of their competition. The State should retain sufficient control over these corporations to prevent their consolidation, when their continued competition would prove beneficial to public interest.

EXERCISE FOR CHEST DEVELOPMENT.—Exercises of strength, writes Dr. Fernand Lagrange in the *Popular Science Monthly* for February, lead rapidly to an increase in the size of the thorax. It is the same with exercises of speed when they need very energetic movements. No exercise develops the chest as rapidly as does running, unless it be wrestling. Mountaineers all have large chests, and the Indians who live on the high plateaus of the Cordillera in the Andes have been noted for the extraordinary size of their chests. This great development in mountaineers is due to two causes which act in the same direction—frequent ascent of steep inclines and constant residence at great heights at which the air is rarefied. The climbing of these slopes needs a great quantity of work, which causes increase of the respiratory speed; respiration in a rarefied atmosphere obliges a man to take deeper breaths in order to supplement, by the quantity of air breathed, the insufficiency of its vivifying properties. Singers, with no other exercise but singing, acquire great respiratory power and a remarkable increase in the dimensions of their chests. Numerous observations prove that it is enough voluntarily to take a certain number of deep breaths every day to produce, in a short time, an increase in the circumference of the chest which may amount to two or three centimeters.

THERE IS NO HARMLESS HYPNOTIC.—Dr. Hutchinson says: "I have recently met with several cases of insomnia due to overtaxation of the American nervous system, and have been requested to prescribe some drug that would be effective to procure sleep and be at the same time harmless. No such drug exists. There is no medicine capable of quieting to sleep voluntary life that has been working ten hours at high pressure, except it be more or less poisonous. Consumption of chloral, bromide in some form, or opium, has increased in this country to an incredible extent, is still growing, and a large number of Americans go to bed every night more or less under the influence of poison. Sleep thus obtained is not restful or restorative, and nature eternally exacts her penalties for violated law more severely in these cases than in most others. Digestion suffers first; one is rarely hungry for breakfast, and loss of morning appetite is a certain sign of ill-health. Increasing nervousness follows until days become burdensome, and poisoned nights the only comfortable parts of life."—*American Magazine*.

CHILLS AND FEVER.—"Uncle Dan Perkins" has given the *Monroe Tidings* the following recipe, which he avers has cured hundreds of cases of chills and fever in Tulare county and elsewhere, without failing in a single instance. Here is the prescription: Put the yolk of one fresh-laid egg into four to five (according to age of patient) spoonfuls of older or wine vinegar; beat well together and take a dose like this three times a day for three consecutive days, half an hour before each mealtime, and do not stop short of the nine doses, even if the chills have ceased.

INFLUENCE OF LIGHT ON THE HUMAN SYSTEM.—Italian physiologists have shown that change of tissue in animal organism is promoted by light. It is further found that the change is so slow in darkness that the ordinary reserve of nutriment stored in the body is sufficient to preserve from starvation for a very long time.

CHOLERA IN ASIA.—A correspondent of the *Bulletin Medical*, writing from Teheran, says that cholera in a virulent form exists throughout the valley of the Euphrates, and it is feared that it will become epidemic in Persia.

USEFUL INFORMATION.

CONTINENTAL DESERTS.—The most recent explorations appear to show that the popular idea that the great African continental desert of Sahara and our own great American desert are not as desolate as they have been represented to be. According to the *American Field*, cargoes of bones are being collected on the desert of Sahara and shipped to New York, just as buffalo bones have been gathered on our Western prairies for many years. They are ground up and used as fertilizers. The interesting query at once presents itself as to what particular time, more or less remote, those localities on the great African desert where these bones were found were covered with verdure sufficiently luxuriant to produce the food which gave sustenance to the animals whose bones are now being gathered. In Africa the caravans have followed the same old trail for centuries, and until the military campaigns of the last few years disclosed fertile spots and oases which were previously unknown, the whole vast region was supposed to be an arid waste of shifting sand. Explorations may yet discover that as large a portion of the African desert is arable as of the civilized American desert. Assuredly it must at one time have been well clothed with verdure to have harbored the immense number of animals represented by these numerous collections of bones.

ORNAMENTAL HOSE.—It was a coil of rubber hose to hang in the hall of an infirmary, to be used in case of fire. One day they took it down in order to sprinkle the lawn, but as soon as the water was turned on it burst in half a dozen places. The infirmary directors were raging. They took the hose back to the rubber store and demanded an explanation. The proprietor of the store said that he had sold it in good faith, supposing it to be a good article. In order to satisfy himself, he wrote to the manufacturer, who replied that the hose was simply an ornamental article, made to hang up in factories "to satisfy insurance requirements." So there is a hose made that is to be looked at, not used! Here is a big factory, and its owner, supposing that in case of fire he can turn on twenty lines of hose at once, is putting his trust in a rotten, good-for-nothing pipe. Better inspect all these emergency hose lines at once.—*Cincinnati Times Star*.

SOOT OUTSIDE OF CHIMNEYS.—Soot is very often seen to gather on the outside of chimneys. A correspondent of the *Boston Journal of Commerce* says he has a chimney 150 feet high covered with soot from bottom to top, and asks the cause. That journal answers as follows: "One of the products of combustion is water formed by the union of hydrogen and oxygen in the fuel when present in the proper proportion. This water escapes in the form of vapor and some of it is condensed on the inside of the chimney. The brick being porous absorb the water, which works its way through to the outside, carrying soot with it by capillary attraction, and, in time, enough appears to be observable on the outside. Where wood is used for fuel this should show more plainly, owing to the considerable amount of water appearing about the furnace and connections when wood is burned."

"SMOKELESS POWDER" was the subject of a recent lecture by Sir Frederick Abel at the British Royal Institution. After dealing with the history of the manufacture of gunpowder and the difficulties attending the production of the higher explosives—gun-cotton, dynamite, melinite and blasting gelatine—Sir Frederick observed that the smokeless powder of Europe which was now being manufactured was a gelatinous substance shaped into threads and strips under pressure. It was made by dissolving gun-cotton or some similar material with camphor or other solvent, and forcing the compound, when properly prepared, through perforated dies. The lecture, illustrated with experiments, was heard with deep attention by a large and fashionable audience.

NEW ROSES INTRODUCED THE PAST YEAR.—Of the 108 new roses produced during the year just passed, 73 are credited by a Vienna journal to France and but five to the United States. Of this latter number San Francisco is down for one, to which very high praise is given—the "Rainbow," which has attracted much attention at the meetings of our Floral Society. It was produced by Mr. J. H. Sievers of San Francisco and is a sport from Papa Gontier. Two new varieties—the Rosalie and the Marshall P. Wilder—are credited to Messrs. Ellwanger & Barry; the Dinmore to Peter Henderson, and the White Pearl simply to America.

STOPPING FIRE ON WATER.—An arrangement to prevent the spreading of oil burning on the surface of the water in harbors is described in a French paper, and is in use in several French harbors. It consists of a floating dam built up of galvanized sheet-iron boxes with flexible connections. By means of this a section of a harbor may be cut off from the rest, and burning material confined where it will do least damage.

AMMONINE is the name of a new prepared chemical, intended as a substitute for caustic soda in the purifying of rags, old papers, etc. It is of German origin. The makers of this

new chemical compound claim for it advantages as a "cleaner," entirely saving the use of caustic in preparing certain "white" stock, besides in no way injuring the strength of the fiber.

PRESERVING ORANGES.—It is said that oranges are now preserved in silos made in the sand, being first wrapped in tissue paper.

ELECTRICITY.

THE STORAGE BATTERY FOR ELECTRIC LIGHTS. The use of the storage battery for lighting purposes is attracting increased attention, especially among the manufacturing corporations to whom the efficient lighting of mill plants in winter-time is of the first importance. The storage battery as a practical means of supplying both electric light and power is now fully recognized and thoroughly appreciated by those who have given it a practical application. Evidence has demonstrated that electric lighting can be done with as much ease, safety and economy from a storage battery as gas lighting can be done by a gas company. This has been done without antagonizing either the interests of the gas or electric-light companies. The introduction of the electric light has increased the consumption of gas, having brought its price low enough to be used as a fuel. On the dynamo of the electric-light companies the storage batteries must depend in a great measure for their source of supply, and this fact must necessarily benefit the electric companies. The Sorley Storage Battery Co. of Lowell, Mass., claims that the problem of the economical commercial use of storage batteries has been solved and that batteries will soon be made that will be capable of supplying a mill with 2000 incandescent lights. Several mills have water privilege which can be used 15 hours a day but now are used but 10 hours, and it is suggested that the power which is now unused could be advantageously used to light the mills during the night. Several owners of large blocks in Lowell are also considering the feasibility of using their elevator engines during the day to run a dynamo and indirectly charge storage batteries to light their mills. The electric current used from the batteries will be measured by meters.

SAFETY OF ELECTRIC LIGHT.—The experiments made by the Paris Society of Electricians as to the danger of fire from electric lighting, appear to have been very thorough. An experiment was made with a bare wire, placed on a small board, and in part with a second board—a wire which should normally contact a current of about four amperes—and the current was carried up to 40 amperes without the wood commencing to carbonize. For a current much more intense the wood took fire at the part where the wire is uncovered before burning the other part, where the want of air made inflammation slower. It is known that these accidents are avoided in a very efficacious manner in practice by the use of fusible plugs. In order to determine to what extent the lamps themselves were capable of setting fire to strips and combustible bodies placed in their vicinity, the globe of an ordinary arc lamp of the Cane system was enveloped in several thicknesses of green tulle; a 32 candle incandescent lamp was enveloped in the same way, the folds of the material being joined under the lamp by an india-rubber band; a lamp of 33 candles was covered with a cotton cap of double thickness; another was covered with a sort of black silk, which was in its turn covered with another of black velvet; two lamps were covered with two layers of gummed wadding, white in one case and black in the other; a lamp of 32 candles was placed in vertical fold formed by an old theatrical decoration; and, lastly, a lamp of 300 candles was applied against an old decoration. It was found that neither carbonization nor exaggerated heating took place in 20 minutes in the first, second, fifth or seventh experiment.

WHAT ELECTRICITY WILL DO IN THE NEAR FUTURE.—Prof. R. H. Threlton, in a recent article, gives a graphic description of what electricity will do in the near future. He says it will break up the present factory system and enable the home worker once more to compete on living terms with great aggregations of capital in unscrupulous hands. Great steam engines will undoubtedly become generally the source of power in large cities and will send out the electric wire in every corner of the town, helping the sewing woman at her machine, the weaver at his pattern loom, the mechanic at his engine lathe, giving every house the mechanical aids needed in the kitchen, the laundry, the elevator, and at the same time giving light, and possibly heat, in liberal quantity and intensity.

ANOTHER ELECTRIC DANGER PREVENTIVE.—Inventors are rapidly coming to the front with devices to avoid danger from electric currents. We clip the following from an Eastern exchange: Anything which tends to decrease the danger at present attending electric wires is of interest in all cities and villages where electric light or other high tension currents are used, and experts are hard at work to invent something practical to overcome this danger. One of these inventions now being tested in New York appears to fill the bill pretty well. It is a small contrivance and resembles an ordinary telegraph instrument. It consists of

a coil of wire, through which is run a metal rod, on the upper end of which is a rubber button. The lower end of the rod comes in contact with the brass bar swaging in the center like a see-saw. At the opposite end of the little bar is a lever like a switch, which connects with the dynamo and cuts off and turns on the current. The little swinging bar rests with a catch on top of this lever. The instant the charged wire is severed at any point along the circuit, the safety device is so constructed that the swinging bar drops from the metal rod in the coil, thus releasing the switch lever at its other extremity, and the lever thus released automatically cuts off the current from the dynamo. Ernest P. Clark, the inventor of this appliance, cut a wire running overhead which supplied a circuit of 30 lights in his laboratory. The little automatic safety device clicked, the lights were immediately extinguished and the electrician picked up the severed ends of the wire and handled them with impunity.

THE BUILDER.

Flooring.

In order to have a first-class house, it is necessary that the floors should receive a great deal more attention than is usually given to that part of the work, especially when the floor is to be laid in a store, office, hall, or other similar uncovered condition.

In the first place, the material should be of the best. Select those boards having a straight, or "comb" grain, as it will wear longer and better than those which are "quartered" grain, and which in time "split" and break out in layers, causing great holes in the floor, and not infrequently holes in the shoes and feet of those walking on them. As all woods shrink more or less, it is best to have the flooring narrow, as the shrinkage is more evenly distributed than where wide stuff is used; besides, it looks better. Of the hard woods, oak, ash, maple and walnut are used a great deal; but it is safe to say that 80 per cent of the floors laid are yellow pine, which, if properly done, will give better satisfaction than if some of the higher-priced woods are used.

Before "laying" the floor, it is necessary to have the floor beams even on the top edge, and as it is almost impossible to find a lot of beams of the same width, they should be taken to a "size" on the ends and over girders, after which they should be "bridged" at least two rows for every 25 feet of width, the beams being placed from 12 to 16 inches to centers.

Having got everything in readiness for laying, see that the first "streak" is straightened thoroughly its entire length, then commence and lay each board, milling it through the tongue edge to each beam, not skipping three or four beams, as many do, or, as is often done, laying several streaks at once and packing them up, nailing the outside one only. Moreover, see that the "butts" are cut square and not "under," as is the common practice, which, when it is worn down, causes the butts to gap.

Bruising the edges or tongues should be avoided, which is best accomplished by using a piece of the same flooring to ram against, or, what is better, using one of the many good patent flooring jacks.

This method, if faithfully carried out, will insure as perfect a floor as it is possible to make, leaving a surface smooth and free from cracks and nail-holes.

For floors which are to be carpeted, or otherwise covered, narrow white pine will give the best results, which can be laid several streaks at a time and nailed through. Moreover, it will be easier to tack the covering to, and remove the same at the usual house-cleaning period, than if a hardwood floor is used.

ENGLISH DWELLINGS.—The characteristic English dwelling is described as a two-story brick house, walled in, and with the best part of the house at the back; there are the drawing and dining rooms, while the kitchen and pantries are in front. In suburban and country houses the rooms are large, and are arranged around a hall; but the windows and doors are small. The outside is almost uniformly without architectural decorations, and the dullness of the climate is seen in the somberness of the furniture and the adornments of the house. The interior is dull and uncheery. There is little "sweetness and light" in the colors, forms and expressions, except in the dwellings of more recent building and furnishing. Up to within a few years, the inside finish was all of dark wood, and the furniture was mahogany, of very heavy and ungainly construction. But if you can dissociate the idea of comfort from that of art, the English home has a very marked spirit of comfort. The sofa is easy and big, and the chairs were made to use. The walls are papered—never painted—the papers being dark and of large pattern. The dining-room is the living-room of the middle-class families. Such of the family as remain at home, sit there in the forenoon and until after the noon meal. Were the color of the English house less somber and the furniture less cumbersome, were the rooms more open and less separated from each other, it would be the center of the most perfect exterior comfort known to the domestic life of this world. As it is, the English home is the home of sweet love, of thoughtful civility, and of unforgetting and undying loyalty.



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Passing Events.

In another column will be found a statement of the foundrymen's side of the issues involved in the prevailing strike in the iron business in this city. A great deal of money is being lost by both parties to the contest, but at present there are no signs of any settlement being made for some time to come.

Advices from Washington indicate that there is probability of an appropriation in the River and Harbor bill of \$500,000 for the Sacramento and Feather rivers, and \$250,000 for the San Joaquin river. It looks, however, as if there would be no special Commission to take charge of the improvement of these streams, since the Chief of Engineers wishes his own assistants to do the work.

The commencement of work in hydraulic mining on the Masac concession, Lower California, by Chinese, marks an epoch in Mexican mining matters. This is the first time that placer mining on a large scale has been attempted there, and the first time a big company of Chinese miners has commenced operations.

The rains of this week have still further put off the time for active work in quartz development in California. There is so much water in the ground that the miners have as much as they want to do in pumping out their mines. Just at present very little else is being done in most of the quartz-mining sections. The mountain roads are still in very bad condition, preventing the hauling of ore or supplies.

Magnetic Iron Sands.

EDITORS PRESS:—Inclosed you will find a sample of magnetic iron sand. Is there any place where it is being utilized? Has it any value for being worked into iron and steel? Any information concerning it will be gratefully appreciated.

Santa Cruz, March 22,

JESSE COPE.

The sample referred to is the ordinary black sand or magnetite found on the sea beaches of this coast and in the ancient-river beds. Sand of the same character has been used for making iron in New Zealand and in the South of France, but not with any marked success. A few years ago a large sum of money was spent fruitlessly at Old Sancelito, on the bay shore, by parties who were trying to make iron from the Gold Bluff sands. Oil was used for fuel and quite an extensive plant was built. The enterprise was not a success. The iron made from these sands is of a superior character, but it seems impossible here to make the iron to compete with that made from ore.

The fine sea sand on the shores of Long Island Sound contains goodly quantities of this magnetite. A magnetic separator called the Buchanan (Illustrated in the PRESS Feb. 8, 1890), is used for separating these magnetites from the sea sands. A large plant on the same principle has been sent to New Zealand. Other forms of magnetic separators are utilized for separating the magnetites from crushed ores. At the Croton magnetite mines near Brewsters, N. Y., a magnetic separator is used. The noted inventor, Thos. A. Edison, has devised a machine of this kind which can treat 300 tons a day. The only attempt, on any large scale, made on this coast to utilize these black sands for their iron was at Sancelito. There has always been more or less talk about the possibilities of the industry, but the failure in the instance alluded to has deterred others from making any attempt to utilize the sands. John Birkinbine, 152 South Fourth street, Philadelphia, and Thomas A. Edison, Menlo Park, N. J., are familiar with the means adopted in the East to utilize these sands. The article in the PRESS of Feb. 8th last shows the various forms of magnetic separators.

Quartz Boulders.

A curious strike of quartz boulders has been made ten miles west of Castle Crag siding, Shasta county, on the California & Oregon railroad. It consists of quartz boulders in size from 250 pounds up to large ones weighing tons. The boulders cover an area of 20 to 30 acres altogether. When broken they show more or less gold. Castle Crag siding is between Sims and Lower Soda.

The find was made last fall, just as the severe winter set in, so that little has been done upon it to determine the extent of the boulders. The region is mountainous, and it is supposed that these large pieces of quartz are from a ledge near by, which, however, has not yet been found. We are told by one who has seen pieces of the quartz that some of it is quite rich in gold. There is a great deal of snow in the vicinity still, so that very little work can be done, but the men who have made locations will begin a vigorous search for the ledge as soon as the weather permits. Many of the boulders are very large, indicating that they came from a ledge of magnificent proportions. The adjacent region will be very thoroughly prospected during the next few weeks.

ARIZONA LOW GRADE ORES.—James M. Dawley, formerly of Bodie, is now at Kingman, Mohave county, Arizona, and has started up the mill of the Atlantic Mining Co., a Los Angeles corporation. He is using a Dodge crusher and pulverizer, and writes that the machinery works splendidly, pulverizing from 12 to 16 tons of hard quartz in 12 hours. The pulverizer is one of small size. Everything in and about the mill runs to perfect satisfaction. A Dodge jig and trommel will be added soon to concentrate the tailings from the leach-tub. The ore is leached without roasting, and the natural chlorides leached out; then the tailings from the tub are concentrated, admitting of working to a close percentage. In this way the leaching process gets what the concentrators might lose, and the concentrators get what the leaching might lose. This is the second Dodge mill in Arizona, the other one being at the Grand Prize mine and working successfully.

The yield of the Comstock mines last week was \$133,036, from 6137 tons of ore.

The Colorado Canyon.

NUMBER II.

The observer who, unfamiliar with plateau scenery, stands for the first time on the brink of one of these gorges, is perhaps disappointed, for it does not seem as grand as expected. But when we make comparisons, we realize its proportions. Looking across an abyss to the opposite crest-line, we get our first notion of the reality. Every time the eye ranges up and down the face of the cliff its face appears more distant and more vast.

From the lower end of the Toroweap valley, the scenery becomes colossal. Its magnitude is by no means its most impressive feature, but the precision of its forms. The dominant idea before the mind is the architecture displayed in the profiles. It is hard to realize that this is the work of the blind forces of nature. At the foot of the valley, the western wall is nearly 1500 feet high, the eastern about 2000, and the interval separating them about three miles. Suddenly they turn at right angles to right and left and become the upper wall of the Grand Canyon of the Colorado. The Toroweap valley now opens the main passage-way of the great chasm.

Climbing among the rocky ledge which lie at the base of the escarpment, we at length obtain a standpoint which enables us to gain a preliminary view of the mighty evenness. To the eastward, it stretches in vanishing perspective 40 miles or more. Between symmetric walls 2000 feet high and five miles apart is a plain, which, in comparison with its limiting cliffs, might be regarded as smooth, but which in reality is diversified by rocky hummocks and basins, and hillocks where patches of soil give life to scattered cedars. Of the inner chasm, nothing is yet to be seen. Moving onward on this platform, we find its surface to be mostly bare rock, with broad, shallow basins etched on it, which hold water after the showers. There are thousands of these pools, and they gleam and glitter in the sun like innumerable mirrors. As we move onward toward the center of the grand avenue, the immensity and beautiful proportions of the walls develop. The vista toward the east (see engraving) lengthens out and vanishes against the blue range of the Kaibab, which lies as a cloud upon the horizon.

At a distance of two miles from the base of the northern walls, we come suddenly upon the inner chasm. We are not conscious of its proximity until within a few yards of it. In less than a minute after, we recognize the crest of the farther wall of this abyss, and crane over its terrible brink and gaze upon the water of the river full 3000 feet below. The scene is a type of the Grand Canyon throughout those portions which extend through the Kanab, Uinkaret and Shivwits plateaus.

EXPLOSIVES IGNITED BY LIGHTNING.—During a severe electric storm that swept over the mining pueblo of Hauchaca, in Peru, recently, the lightning struck a magazine, exploding 200 cases of dynamite. The entire works were wrecked. Five persons were killed outright, and 40 more or less seriously injured.

SCHOOL OF MECHANICAL ARTS.—The Board of Lick Trustees have held a meeting with reference to that portion of the Lick trust connected with the School of Mechanical Arts, and will proceed at once to take action with reference to carrying out the decree of the Superior Court.

WATER has been turned into the new flume of the hydraulic mining enterprise of the Lower California Mining Co., working under the Masac concession. The flume, which is five miles long, carries 600 miners' inches of water. Chinese have a contract to work the ground.

MILL BURNED.—The ten-stamp mill of the Standard Mining and Reduction Co., located eight miles south of Prescott, Arizona, was destroyed by fire last Tuesday. The mill was erected about two years ago at a cost of \$30,000, but of late has been in litigation.

BLACK SULPHURET ORE.—A strike of very rich black sulphuret of silver has been made in the Arizona mine at Unionville, Humboldt county. The new strike was made in a hill opposite to one from which several millions of dollars were taken out in the early days.

The Foundry Strike.

A Plain Statement of the Case.

There is very little change in the situation of the molders' strike. The attempt to get one of the men from the East out of the Risdon Works on a writ of habeas corpus was a failure. The allegation that he was restrained of his liberty was denied by the man himself, who had authorized no one to make such a statement for him. The molders have sent back East some of the men who came out, and applied to Senator Stanford for a reduction of fare for others; but he referred them to the railroad officials here. More men are expected from the East, and some of the local molders are going to leave for New York and Chicago. Steps have been taken by the owners of foundries to protect their men and property in case of further trouble, though there have been no overt acts. One of the shops—the Risdon—has now more molders than before the strike, and is turning out work for some of the other foundries. While the molders profess confidence in ultimate victory over their employers, the foundrymen are organized and prepared for a long-continued contest, feeling that the former condition of affairs can no longer be tolerated.

The Engineers and Iron Founders' Association makes a statement concerning the matter which we print in full as follows:

The Foundrymen's Statement.

To all genuine friends of labor.—A true statement of the real cause of the present Iron-Molders' strike:

A statement addressed to the friends of organized labor has been issued by I. F. Valentine, as President of the Iron-Molders' Union. This letter professes to be a true statement of the real cause of the iron-molders' strike. As it is, however, incomplete and misleading in many respects, the employers in question have considered it proper to make known to the public, and also to the iron-workers of this city, what effort has been made to avoid this struggle on the part of their association and also on the part of the proprietors of the Occidental Foundry, where the Molders' Union struck its first blow.

At the beginning, we would contradict the assertion that the association is opposed to labor organizations. On the contrary, the Molders' Union was built up without any opposition on our part, some of the employers, in fact, approving and encouraging its growth and subscribing to its funds.

We will not here state the change in the policy of the Union which has forced us to take a stand in our own defense of our rights. That change will be understood by a careful reading of the preamble to the resolutions which close this article.

Mr. Valentine opens his letter with this statement, that "the signal for trouble was the receipt of a letter from the Iron-Founders' Association on the 13th of December, 1889, setting aside the mutual agreement of August 30, 1887."

Had Mr. Valentine stated the action of the Union which called forth that letter from the Employers' Association, the public and many of the iron-molders themselves would have been in a better position to judge of the real cause of the strike. We will therefore supplement his statement. On Sept. 16, 1889, the Molders' Union sent notice to the foremen of foundries that "They would not be allowed to work on the floor unless they first became members of the Union."

Now, if a foreman, working on the floor, did any injury to the men, was that injury removed if the foreman joined the Union and still continued to work?

No! The movement was simply an effort on the part of the Union to get under its control the last semblance of authority which had been left to the employers in the management of their affairs. The notice was the "velvet paw" which drew the foremen into the Union. The "claw" will be found in Section 5, Article XVI of the Union rules, which we quote:

"Any member who shall use his position as foreman to the detriment of the Union, or any member thereof, shall be fined a sum not less than \$50 nor more than \$200; and for the second offense shall be expelled."

As no Union men would work in the shop with an expelled member, expulsion would practically mean banishment from the State. The foreman is supposed to represent the employer among the men. Should he join the Union and become subject to the above penalties on the complaint of those under him, it can be readily understood that the Union would have secured absolute control of the business.

The McCormack Bros. refused to recognize this order and their shop was struck. As the order was considered by the Iron-Founders' Association to be a violation of the standing agreement (that no change should be made in the trade regulations without first calling a conference), the right of the Union to issue such an order was considered a proper subject for arbitration.

On Oct. 18, 1889, with the consent of the McCormack Bros., the Secretary of the Association was instructed to notify the Union that we were ready to submit the question to the decision of disinterested arbitrators.

On the 20th of October, 1889, a reply was received from the Molders' Union, refusing to accept arbitration as a mode of settlement, on the grounds that the order in question "was one of the fundamental laws of the National Union."

This refusal was in keeping with the statement of the committee of the Molders' Union that "Might made right and they had the might."

We would here state that one of the remarkable features in these so-called fundamental laws is that they are violated with impunity in every city in America except San Francisco. In all cities Union

men work with non-Union men in shops where the minimum rates and limit of apprentices are never heard of. But when the San Francisco employer tries to roll over in his uncomfortable bed and appeal to the justice of the community he is told to lie still—that it is a fundamental law that is crushing him and there is no redress.

In consequence of this refusal and there being no indication of the strike against McCormack Bros. being declared off, the letter dated Dec. 13, 1889, and referred to in the opening of Mr. Valentine's statement, was issued. This letter declared our withdrawal from the old agreement upon which such a one-sided construction was being placed and opened the way for future negotiations.

As some of the regulations enforced by the Union men were found to be working an injury both to the trade and the workmen, a letter was sent to the Union on Jan. 14, 1890, asking a conference, with the view of having these regulations modified. At the conference which followed the condition of the trade was fully discussed and the following proposition was made by the association delegates:

1. That the Union shall, at its next convention, endeavor to secure for the shops a larger percentage of apprentices.

2. That the minimum rate be fixed at \$3 per day.

3. That apprentices, after their time had expired, should work one year under instruction before being entitled to demand the minimum rate.

4. That all limitation on work be withdrawn.

While the association simply asked for a modification of the apprentice rule which allows but one

pay from \$3.75 to \$4.50 per day, and reduce them to the general rate, \$3.50, or ask the restoration of their \$3 men. The latter seemed the only just plan, and it was therefore explained and proposed.

In reference to the limitation of work Mr. Valentine states that, "with the exception of one solitary instance, the Union has never limited its members in the amount of work they shall perform." We will admit that, in only one instance, has the Union placed itself on record in writing in regard to this limitation. We will further admit that it would be difficult to regulate all work; but the end is fully accomplished by Article XIII of the Union rules, which reads as follows:

"Any member undermining, or attempting to undermine, a brother in his job or pieces, shall be fined, suspended or expelled, at the option of the Union."

Under this rule there has been a falling off of work performed. As no man was allowed to do more than the man who had preceded him, the lazy or incompetent man could set the standard for the entire shop. The results of this are shown in that, since the strike, when the spies of the Union were out of the shops, apprentice boys have turned out as much work as was being done by experienced, high-priced men; and men who have not worked at the trade for years are turning out from 50 to 70 per cent more work per day than has been done of late by regular workmen.

After submitting the proposition which we have just explained, the association delegates made the following statement:

decided stand, the following preamble and resolutions were issued:

Preamble.

WHEREAS, The Molders' Union of San Francisco have, during the past few years, made and enforced the following rules in the foundry business in this city: Have forbidden the employment of molders not members of their Union; have forbidden the employment of apprentices, save in the proportion of one to every eight men; have forbidden the payment of a day's wages of any less sum than \$3.50 per day; have forbidden the placing of a shop on short time, when the shortness of the daylight or the dullness of trade might make it desirable to do so; have forbidden the foremen of the various shops the right of working as molders unless they first became members of their Union; have introduced a system of limiting the amount of work a man shall perform; have questioned the right of an employer to discharge a molder who may be an officer of their Union, notwithstanding good and sufficient reasons can be shown for such discharge. And whereas, after a fair trial of these regulations at much cost to themselves, employers find that said regulations are driving trade from this city and throwing men out of employment, thus doing serious injury to both employers and employed; and whereas, employers have called a conference with representatives of the Molders' Union, and requested a modification of these innovations; and whereas, the only response has been a refusal to accept any modification of the objectionable regulations; and whereas, the Molders' Union continues to enforce each and all of the aforesaid rules under threats of strikes, boycotts and

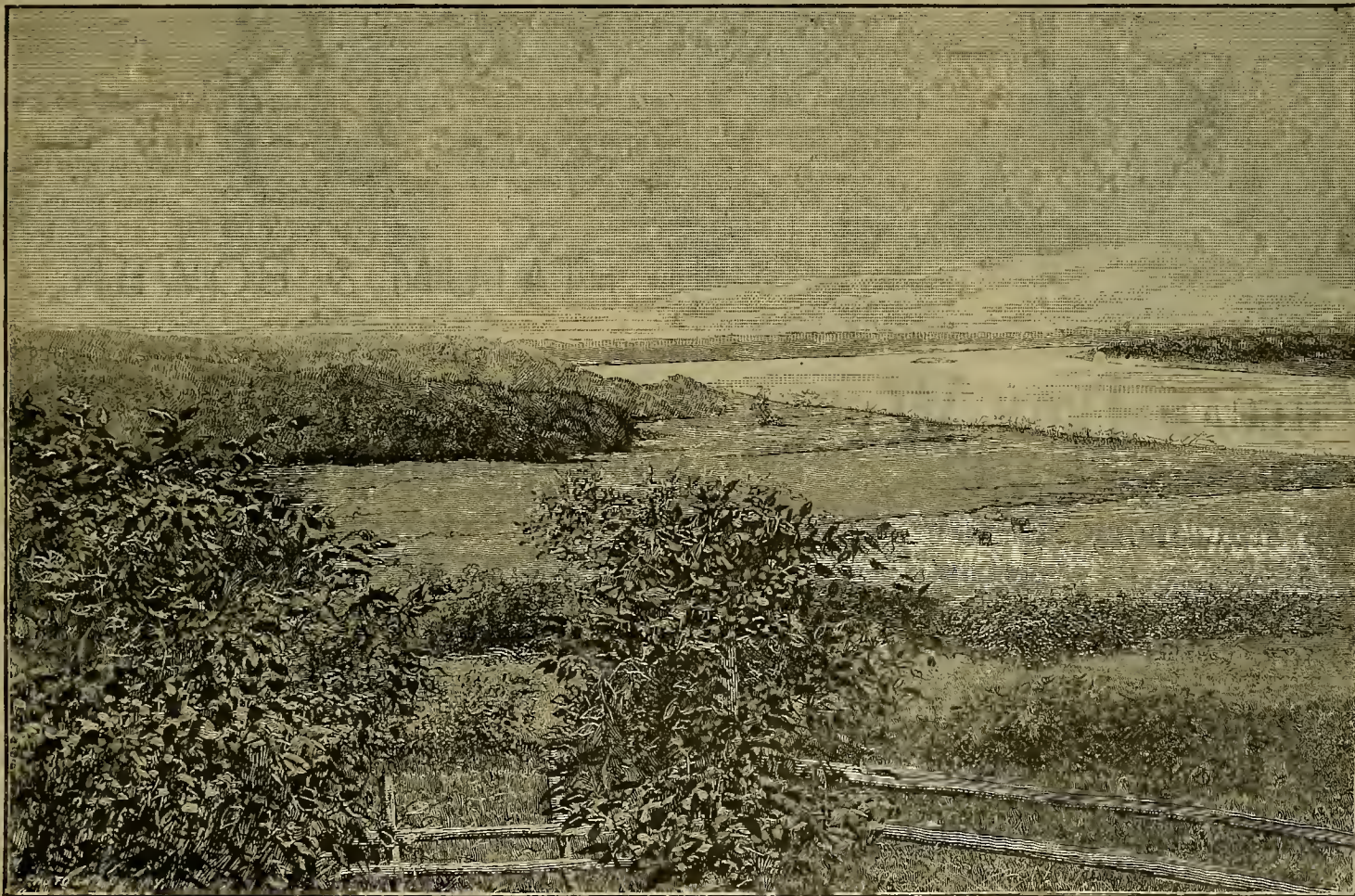
and no man approaches them who may be suspected of being inimical to the molders without running a gauntlet of intimidation.

EXECUTIVE COMMITTEE,
Engineers and Iron-Founders' Association.

The Nicaragua Canal.

A view is given herewith of the valley of the river San Juan, from Fort San Carlos, Nicaragua. The town of San Carlos, at the junction of the Rio San Juan with Lake Nicaragua, is rapidly assuming the proportions of a city in view of its future importance when the canal is built. The proposed route of the canal, laid out by the engineers, is from the harbor of Greytown on the Caribbean sea to Brito on the Pacific. Its total length is 169 miles, of which 38 miles will be excavated canal, 130 miles navigation by Lake Nicaragua, the river San Juan, the outlet of the lake, the basin of the river San Francisco and through seven locks. A canal without locks is impracticable across Nicaragua.

The lake is an inland sea 90 miles long and 35 to 45 miles wide. The lake will be con-



VIEW OF THE VALLEY OF THE RIVER SAN JUAN, THE OUTLET OF LAKE NICARAGUA.

to every eight molders, it is their conviction that such a law should be utterly abolished; as it is entirely un-American in its character, in that the foreign workman is welcomed by our trade Unions with open arms, while the American-born boy is robbed of his birthright, denied the right of learning a trade which would enable him to earn an honest living, and forced to seek associations which must, of a necessity, lead him to the Industrial School or State Prison.

In offering a minimum rate of \$3, we were restoring the rate which formerly prevailed, and which was injudiciously raised by the Union some years ago.

A return to the rates mentioned was decided upon after receiving information from forty different parts of the East, which showed a maximum rate of pay at these points of \$2.75 and a minimum rate of \$2.

The correspondence in this connection was submitted to the delegates from the Molders' Union and they admitted that such were the facts.

In Mr. Valentine's letter the statement is made—"They required us to accept a reduction of fifty cents per day." This would give the impression that a general reduction of fifty cents per man was desired. It was fully explained to the Union delegates that no action of that nature was contemplated. In all trades there are men who are considered third-class workmen, who, in the case of the molders in years gone by, found employment on the cheaper grade of work at \$3 a day. A few men of this class would find work in almost any shop. The raising of the minimum to \$3.50 per day so increased the cost of production that, as a result, we find trade has left the city, and a larger proportion of men are continuously out of work.

To correct this evil, employers had the choice of taking first-class men, whom they had continued to

"We have tried the Union's plan for several years, with the result that the trade has steadily declined, and men have been thrown out of employment. Now, try this plan of ours for just one year, and see if it will not help us to maintain our positions as manufacturers against the steadily growing competition of the East."

In reference to this proposal we will again quote from Mr. Valentine's letter, which states: "They proposed to enter into this agreement with us for one year. It will be seen that at the end of this period we would be caught in the midst of another dull winter season, when the firms would surely demand another reduction. Consequently we declined to accept their proposition."

Now, did ever a man advance a more flimsy pretext for inaugurating an industrial war? No one can doubt that the Molders' Union would have been in as good condition to make a fight next year as it is in this. In face of this fact, Mr. Valentine makes up his mind that further demands will be made by employers next winter, also that next winter will be a dull one, and so justifies the Union in declining the employers' proposition, and in declaring a war which throws a small army out of employment in one of the worst winters California has ever experienced.

It will be seen from Mr. Valentine's statement that the fight is made by him not on account of the present action of the employers, but on account of what he thinks they might do next year.

The refusal of the conference proposition was received by the employers on Jan. 18, 1890. The letter contained no counter proposition; and, hopeless of securing any relief from the Union, all effort to act in concert with that body was abandoned. It being the unanimous opinion of the association members that were they to have any voice in the management of their business, they must take a

other penalties to employers and such workmen as are more reasonable in their ideas; therefore, in consideration of the conditions stated and for the protection of its members in their rights as employers, the Engineers and Iron-Founders' Association of California has adopted the following resolutions:

Resolved, First—That the secretary be instructed to notify the Molders' Union that, while we recognize the right of its members to associate themselves together for mutual benefit, we do not recognize it to the exclusion of molders not members of the Union.

Second—We therefore do not recognize the right of the Union to control us in the employment of non-Union men, nor to regulate the amount of work a man shall perform, nor limit the number of apprentices employed.

Third—That we will not be restricted to a minimum of wages.

Fourth—That all wages be paid by hour, whatever the number of hours worked, and that ten hours constitute a day's work until a less number of hours be generally adopted by foundries east of the Rocky mountains, when the same number of hours shall be the day's labor here.

Fifth—That overtime be paid at time and half, Sundays and holidays as double time.

In conclusion we would state that the members of the Molders' Union having resigned from our employ, and we having accepted their resignation, our relations should end there; but the molders now deny the right of any men to work in the places which they have vacated. Recognizing our right to have any man who may desire to work for us, we propose to protect them in that right to the full extent of the law.

Notwithstanding the constant declaration that their motives are peaceful, their actions are such as to be a menace to the public peace.

The iron works in this city are in a state of siege,

coated with the Pacific by a canal and with the Atlantic by saltwater navigation in the river San Juan by a short section of canal from the river San Juan to the basin of the river San Francisco, and by a canal from the eastern end of that basin to the Caribbean sea.

THE MECHANICS' FAIR.—The Board of Trustees of the Mechanics' Institute have announced that the 25th Industrial Exposition under its auspices will be held at the Mechanics' pavilion, commencing Aug. 19th and closing on Saturday evening, Sept. 27th. The trustees solicit exhibits from every department of invention, industry, art and the natural resources of the coast.

THERE is some excitement at Tacoma (Wash.) over the discovery of gold in Gallagher's gulch, at the south end of the city. The State Geologist is not excited, however, and says he does not think there is gold enough there to call the land mining property.

It is stated that over half a million dollars has been invested of late by London capitalists in Lower California mines.

FOREIGN varieties of coal are very scarce in the market.

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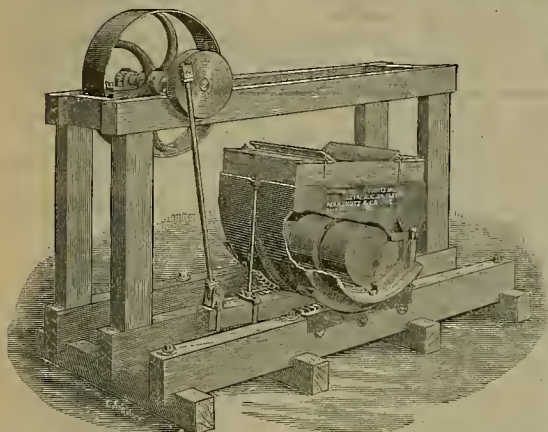
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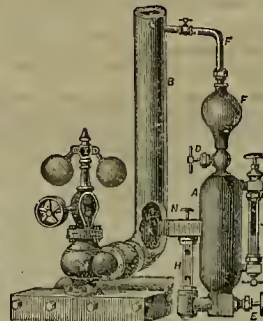
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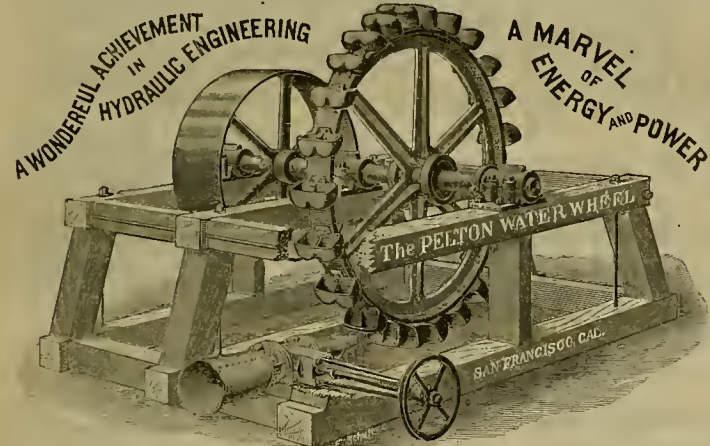
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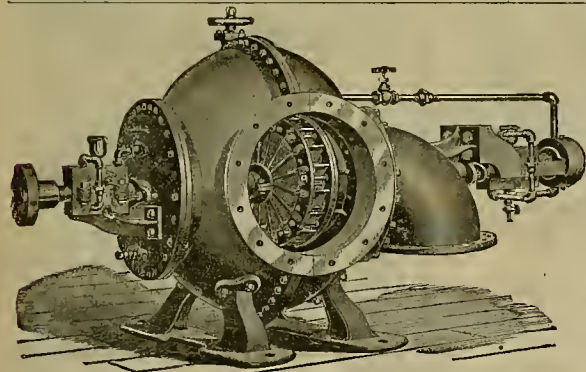
Should state amount, and head of water, power required, and for what purpose; with approximate length of pipe; also, whether the application is with reference to *Wheels* or *Motors* described below. SEND FOR CIRCULARS.

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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, March 27, 1890.

General trade continues fairly active, with the volume of goods going out showing a steady increase. This will be still more marked when the valley and mountain roads become more passable. With foundrymen and machinists there is nothing new to report. The iron-molders' strike is still on, which naturally interferes with work. It is claimed that the strikers' places will be filled by non-union men. It now looks as if both sides have settled down to a recognition of a final struggle for supremacy—one fighting for principle and the other for a chance to turn out work against Eastern competition.

The local money market is easy, with remittances coming in fairly free, while the demand is light. With settled weather the unemployed men are securing work, and the future is more bright. There will soon be a call for men from the mining districts, where but little has been done, owing to a scarcity of water. The large deposits of snow guarantee an ample supply of water throughout the year for all kinds of mining.

MEXICAN DOLLARS.—The demand is light. The last steamer for China took out \$47,781 to Hong Kong.

The market for Mexican dollars closed dull at 75 1/2 cts.

SILVER.—The foreign market has ruled strong throughout the week, while at the East an advance has been established. On this coast the supply of bullion is quite light, or at least the Mint finds considerable difficulty in getting it, owing to tight offerings. There is no denying that the output on this coast, not considering Montana and Colorado, is less than at this time last year, while it looks as if there will be no considerable increase in the near future. The Tuscarora mines, which promised so much when they were dealing the stocks, are turning out but little bullion. Of course plausible excuses are given for the poor returns. The Comstock stocks are gradually going into gold, with the percentage of the latter promising to largely increase in the near future as work in the mines is pushed to the west. The Arizona silver mines are not showing an increased output.

The Windmill has been favorably acted on by the House Committee. A favorable report by a House Committee is, at this session, equivalent to a passage in that body. The objectionable sections have either been eliminated or else amended so as to make the bill acceptable. Our advisers abroad indicate that the action of Congress is being closely watched, and if the bi-metalists are successful, more favorable action will be taken by England and Germany.

The Mint paid for silver the past week 95 2-5 cts. London cables quote that market at 43 13-16d.

QUICKSILVER.—Receipts the past week aggregate 137 flasks, and exports by sea 195 flasks to Guaymas and 25 flasks to Mexico. The market is very strong, with a good home demand ruling. English advices from Southern Africa report a discovery of cinabar mines, but how extensive is not reported. English mining papers are very hopeful from the advised prospects.

ANTIMONY.—The market is fairly steady. Several mines are said to exist in this State not heretofore worked, owing to the price being too low. Now that the market is high and likely to remain so, capital looking to their development would be well invested. The Saota Madico mine, 40 miles south of Baker City, in Kern county, has all the machinery ready for active work.

BORAX.—Receipts the past week aggregate 418 cwt., and exports 32,540 lbs. to St. Paul and 362 lbs. to Guaymas. The market is reported firm, with a good demand ruling.

LIME.—Receipts the past week aggregate 4179 bbls., and exports by sea 850 bbls. to Honolulu and 100 bbls. to Mahukoma. The home consumption is steadily increasing.

LEAD.—The market is about as heretofore reported. Lead plate manufacturers report that their requirements will be larger than in 1889. At the East, the situation is virtually unchanged.

TIN.—The market for plate continues demoralized. It now looks as if there will be free consumption by canners for both fruit and salmon. For pig the market is fairly steady. English advices report a firm market for pig, but unsettled for plate, owing to the combination to reduce the output not being formed. If this is successful, better prices are looked for. At last advices, 62 works were idle.

IRON.—The market is essentially unchanged. Large holders do not appear disposed to make concessions, believing that large consumers will not be obliged to restrict their work much, if any. English advices lead to the impression that another speculative movement is contemplated, based on lessened stocks.

COPPER.—There is nothing new to report in the market. The syndicate holdings at the East have been placed, which is calculated to strengthen the market. A special cablegram to the Iron Age reports the English market on March 19th as follows: Copper, after declining somewhat, advanced to 47 1/2 s, on considerable improvement in the cash demand, and on Thursday as high as 48 was paid for prompts. Since then, however, there has been a reaction of 47 7/8. A large part of the warrants circulating on the market lately has been absorbed by consumers, and the prospects are considered brighter. Stocks decreased 2000 tons during the first half of the month. Recent sales of furnace material include 100 tons Montana Matte at 10s., 100 tons ditto on private terms, and 1675 tons Aconada Argenterous Matte, private terms; all at Liverpool.

COAL.—Receipts the past week aggregate as follows: Coos Bay, 1450 tons; Seattle, 6100; Departure Bay, 5555; Tacoma, 2400; and Port Townsend, 1204; total, 16,659 tons. The market rules firm for steam under light supplies. Very little can be added to our last week's report. In house coals the market is kept steady by the scarcity of steam and the fear that before Australia begins to send us liberal supplies some accident might occur to one or

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ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AMT. LEVIED.	DELINQ.	SALR.	SECRETARY.	PLACE OF BUSINESS.
Alabama M Co.	Nevada.	1.	8.	Mar 18.	Apr 22.	May 13.	W H Watson.
Bechtel Cons M Co.	California.	11.	10.	Feb 10.	Mar 17.	Apr 13.	C O Harvey.
Basley M Co.	Nevada.	1.	8.	Mar 18.	Apr 22.	May 13.	W H Watson.
Bute King M Co.	California.	1.	30.	Feb 13.	Mar 20.	Apr 12.	W O Lewis.
Confidence S M Co.	Nevada.	15.	75.	Mar 12.	Apr 16.	May 7.	A S Groch.
East Best & Belcher M Co.	Nevada.	1.	25.	Feb 11.	Mar 14.	Apr 31.	C H Mason.
Eureka Cons Drift M Co.	California.	1.	3.	Feb 24.	Apr 5.	May 21.	R A Bab.
Germania Lead Works Co.	Utah.	1.	50.	Mar 12.	Apr 14.	May 1.	D M Kent.
Holmes M Co.	Nevada.	11.	25.	Mar 16.	Apr 17.	May 8.	C E Elliott.
Humboldt M Co.	Nevada.	1.	8.	Mar 18.	Apr 22.	May 13.	W H Watson.
Indian Creek M Co.	California.	1.	10.	Mar 12.	Apr 14.	May 14.	S C Mills.
Martin White M Co.	Nevada.	12.	25.	Feb 18.	Mar 18.	Apr 30.	A B Cooper.
Mayflower Gravel Co.	California.	45.	50.	Mar 8.	Apr 10.	May 1.	M Morizo.
Quaker G M Co.	California.	18.	25.	Mar 8.	Apr 5.	May 5.	A C Ombinant.
Standard Cons M Co.	California.	2.	25.	Mar 4.	Apr 14.	May 19.	J W Pew.
Union Cons M Co.	Nevada.	40.	25.	Mar 5.	Apr 10.	Apr 30.	M Buffington.
Utah Cons M Co.	Nevada.	9.	25.	Mar 11.	Apr 17.	May 5.	A H Fish.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Bulwer Cons M Co.	California.	L. Chalmers.	369 Montgomery St.	Annual.	Apr 9
California Iron & Steel Co.	California.	F Bonadina.	438 California St.	Annual.	Apr 21
Carbon Coal Co.	California.	R G Knapp.	407 California St.	Annual.	Apr 17
Orphan M Co.	California.	T Wetzel.	522 Montgomery St.	Annual.	Apr 4
Co. Bay, Oregon, Coal Co.	California.	W V Huntington.	Fourth and Townsend Sts.	Annual.	Apr 9
Derber Cons M Co.	California.	J M Quast.	328 Montgomery St.	Annual.	Apr 2
Live Oak Drift Gravel Co.	California.	J Morizo.	328 Montgomery St.	Annual.	Apr 15
Russel Reduction & M Co.	California.	J Morizo.	328 Montgomery St.	Annual.	Apr 21

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Champion M Co.	Nevada.	T Wetzel.	522 Montgomery St.	10.	Jan 20
Caledonia M Co.	Nevada.	A S Cheminant.	328 Montgomery St.	08.	Aug 5
Con California & Va M Co.	Nevada.	A W Havens.	309 Montgomery St.	25.	Feb 10
Germania Lead Works Co.	Utah.	T Wetzel.	522 Montgomery St.	25.	Dec 25
Idaho M Co.	California.	T Wetzel.	522 Montgomery St.	25.	Mar 7
El Diablo M Co.	Nevada.	R Heath.	319 Pine St.	30.	Oct 21
Pacific Borax Salt & Soda Co.	California.	A H Clough.	230 Montgomery St.	1.00.	Feb 10

more of the leading collieries on this coast and our coast supplies lessened. The consumption of steam is quite free, but of house it is lessening. There are six vessels with cargoes on the way from Newcastle, N. S. W., of which number three are about due. From Sydney there is one vessel due. The number of vessels listed for this port and not yet left are three at Newcastle, N. S. W., and two at Sydney.

Eastern Metal Markets.

By Telegraph.

NEW YORK, March 27, 1890.—The following are the closing prices the past week:

Silver in Silver				
Thursday.	Friday.	Saturday.	Sunday.	Monday.
43 1/2	95	14 20	3 9 1/2	20 25
43 1/2	95	14 20	3 9 1/2	20 30
43 1/2	95	14 20	3 9 1/2	20 35
43 1/2	95	14 20	3 9 1/2	20 40
43 1/2	95	14 20	3 9 1/2	20 45

NEW YORK, March 25.—Borax was firm at 9 1/2 c; California refined, ordinary trade, pays 69@70c. Quicksilver, crude, whale and sperm oil continue neglected. Lake copper is well controlled and firm; 14 1/2@14 3/4; casting 12 1/2@13c. Fair movement for use. Local bankers are said to have completed negotiations for large delivery of syndicate metal in the next three months. Pig lead quiet and steady at \$3 95@4.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, March 27, 1890.	
ANTIMONY—None in market	7 1/2 @
BORAX—Refined, in carload lots	7 1/2 @
Powdered	7 1/2 @
Concentrated	7 1/2 @
All grades jobbing at an advance.	
COPPER—	
Sol. Bar base	23 @ 25
Sheathing	23 @ 25
Ingot, jobbing	17 @ 18
do, wholesale	17 @ 18
Pig Bar Sheets	23 @ 25
LEAD—	
Pig	4 @ 5
Sheet	7 @
Pipe	6 @
Shot, discount 10% on 500 bags	Drop, @ bag.
Buck, @ bag	1 1/2 @
Ohilled, do	1 1/2 @
TINPLATE—B. V., steel grade, 14x20, to arrive.	4 @
B. V., steel grade, 14x20, spot	4 @
Chalrns, 14x20	6 @ 7 00
do, do, 20x23	12 @
Pig tin, spot, @ lb.	21 @
CORR.—Eng. ton, spot, in blk.	13 50 @ 14 50
do, do, to load	14 50 @ 15 50
QUICKSILVER—By the lb.	50 @
Flasks, new	35 @
Flasks, old	35 @
CHROME IRON ORE, @ ton	10 @ 10 1/2
Sol.—Bar base	3 @ 3 1/2
Norway, base	4 @ 4 1/2
STEEL—English, lb.	16 @ 20
Canon tool	9 @ 9
Black Diamond tool	9 @ 9
Pick and Hammer	8 @ 10
Machinery	4 @ 5
Toe Calk	4 @
IRON—Glenasmole ton	35 @
Eginton, ton	35 @
American Soft, No. 1, ton	35 @
Oregon Pig, ton	35 @
Puget Sound	35 @
Everett, 14x20	35 @
Shots, No. 1	35 @ 35 00
Bar Iron (base price) @ lb.	35 @
Langlois	35 @
Thorndiffe	35 @
Cartier	35 @
Barnwell	35 @
Thomas	35 @
Cargollet	35 @

Coal.

To Load.	
Per Ton.	Per Ton.
Australian	7 50 @ 7 75
Lehigh Lump	16 50 @ 17 00
Everett	5 @ 5 1/2
Cumberland bk	16 00 @
Scotch Splint	9 00 @ 9 00
Egg, hard	15 00 @
Cardiff	9 50 @ 10 00
SPOT FROM YARD.	
Wellington	\$ 9 00
Seattle	7 00
Oreton	8 50
Coos Bay	6 00
Westminster Brymbo	9 00
Cannel	12 00
Nanaimo	9 00
Egg, hard	18 00
Sydney	8 50
Cumberland, in sacks	15 00
Oilman	7 00
do, bulk	14 00

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Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working samples, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of chloride of copper and protochloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Patchen's process, etc. He also describes his methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the titles Smelting, Mexican process, Chilean process, Kroehnke's process, etc. Under "Pulverizing Machines" are described the arrastra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

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Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING MAR. 6.	WEEK ENDING MAR. 13.	WEEK ENDING MAR. 20.	WEEK ENDING MAR. 27.
Alpha	1.00	1.05	.90	.95
Alta	1.20	1.25	1.20	1.15
Anda	.50	.40	.45	.40
Belcher	1.70	1.80	1.40	1.70
Best & Belcher	2.70	2.94	2.55	2.75
Bullion	.55	.60	.50	.55
Bodie Cons.	.50	.45	.50	.45
Bulwer	.20	.15	.20	.15
Commonwealth	.50	4.10	2.50	3.55
Con. Va. & Cal.	4.40	4.60	4.25	4.50
Challenges	1.40	1.58	1.30	1.35
Chollar	2.15	2.02	2.00	2.00
Confidence	3.70	3.78	3.25	3.45
Con. Imperial	.35	.40	.35	.40
Caledonia	.20	.23	.20	.15
Crown Point	1.65	1.80	1.50	1.60
Crocker	.35	.35	.35	.35
Del Monte	1.35	.55	1.20	.80
Eureka Cons.	3.80	4.00	3.75	3.50
Excelsior	.50	.55	.45	.50
Grand Prize	.70	.90	.65	.65
Gould & C.	1.35	1.45	1.10	1.35
Hale & Norcross	2.25	2.30	2.40	2.25
Julia	.24	.20	.20	.20
Justice	1.40	1.50	1.30	1.25
Kentuck	.75	.70	.75	.75
Lady Wash.	.25	.30	.30	.30
Monroe	.35	.35	.35	.35
Mexican	3.25	3.50	3.25	3.50
Navajo	.25	.25	.25	.25
North Belle Isle	1.15	45.11.00	1.25	1.00
Nev. Cons.	1.10	1.00	.90	.85
Occidental	3.95	4.25	3.60	4.15
Ophir	1.05	.95	1.05	.85
Overman	1.55	1.70	1.70	1.85
Potosi	1.55	1.70	1.85	1.80
Pearless	.25	.25	.25	.25
Piedmont	.25	.25	.25	.25
Savage	1.55	1.45	1.60	1.45
S. B. & M.	1.50	1.60	1.25	1.50
Sierra Nevada	2.21	2.30	2.05	2.10
Silver Hill	.30	.30	.30	.30
Scorpion	.25	.25	.25	.25
Union Cons.	2.25	2.35	2.10	2.20
Utah	.60	.65	.45	.45
Yellow Jacket	1.95	2.15	1.90	2.00

Sales at San Francisco Stock Exchange.

THURSDAY, Mar. 27, 9:30 A. M.	1070 Julia.....	50c
200 Alta.....	300 Kentuck.....	80c
300 Alpha.....	420 El Dorado.....	5.50
635 Belcher.....	200 Mt. Diablo.....	1.50
200 B. & Belcher.....	200 Nev. Queen.....	65c
250 Bodie.....	200 Occident.....	1.00
2025 Bullion.....	350 Opbir.....	4.20
400 Caledonia.....	300 Overman.....	3.15
400 Challenge.....	100 Overton.....	1.50
1050 Chollar.....	50 Peck.....	15c
400 Confidence.....	1840 Potosi.....	4.85
450 Crown Point.....	50 S. F. Guss.....	57.50
100 Con. Imperial.....	830 Savage.....	1.90
450 Con. Cal. & Va.....	80 Scorpion.....	75c
50 E. Nevada.....	1050 S. B. & M.....	1.50
1300 Excelsior.....	400 Sierra Nevada.....	2.50
370 Grand Prize.....	100 Silver Hill.....	30c
570 G. & C.....	250 Utah.....	55c
800 Hale & Nor.....	340 Union.....	2.45
550 Justice.....	470 Yellow Jacket.....	2.25

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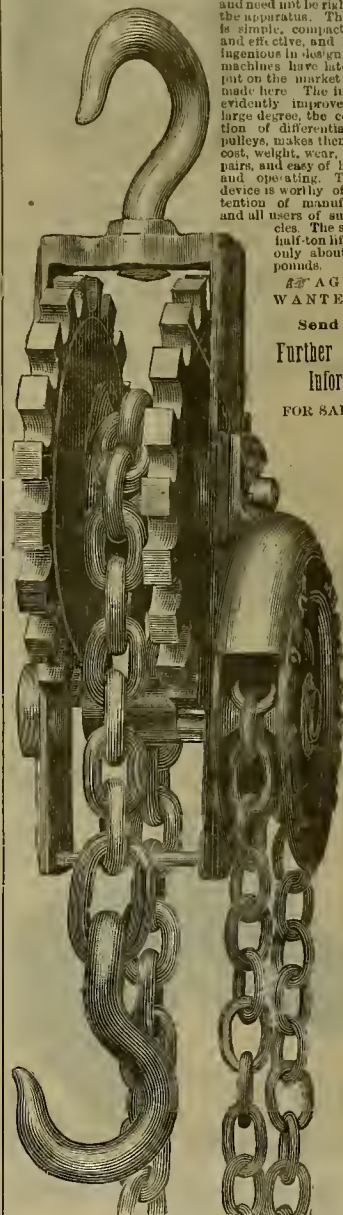
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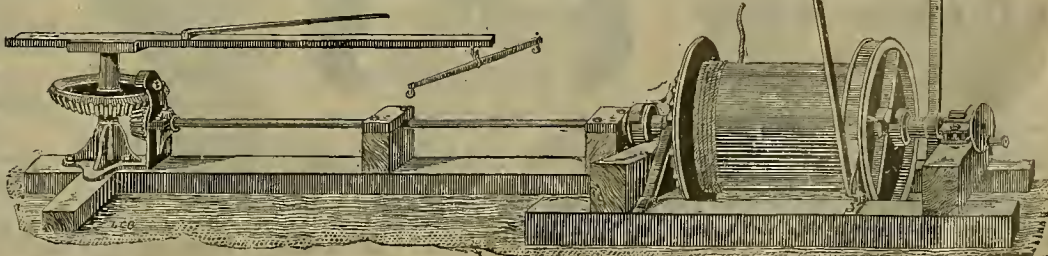
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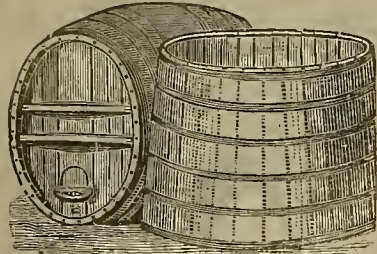


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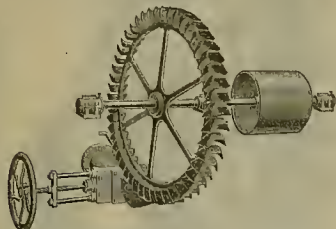
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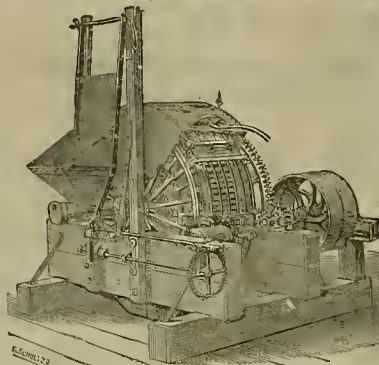
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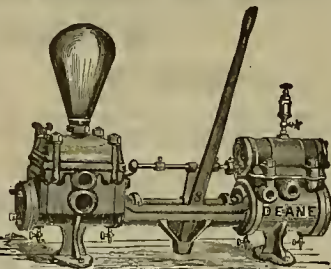
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COAL MINES OF THE WESTERN COAST.

A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

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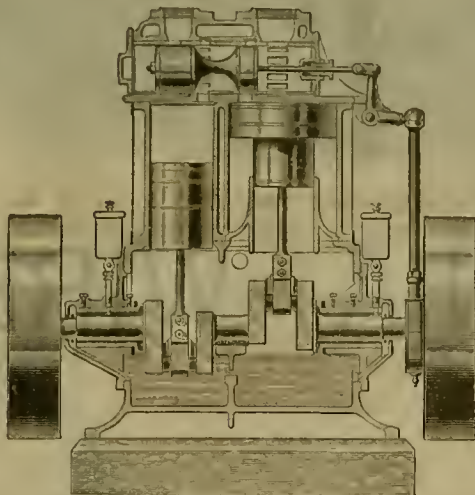
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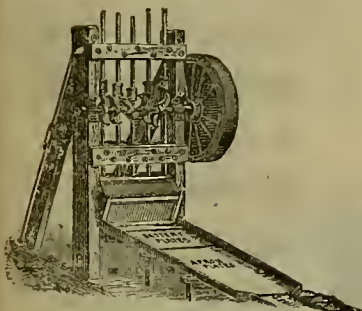
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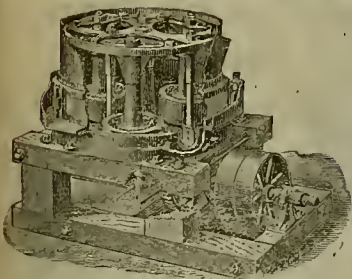
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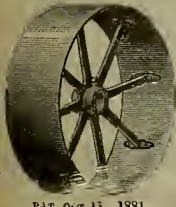
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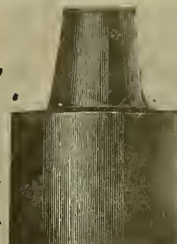
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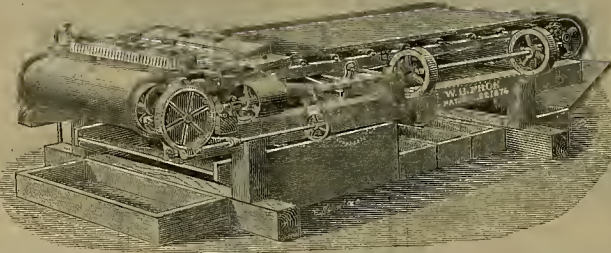


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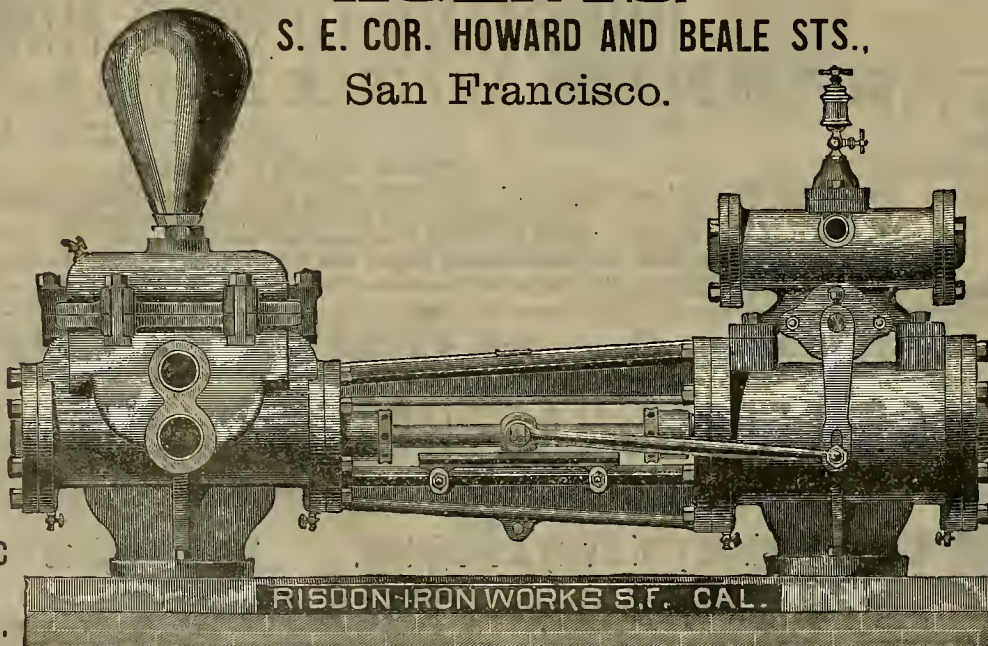
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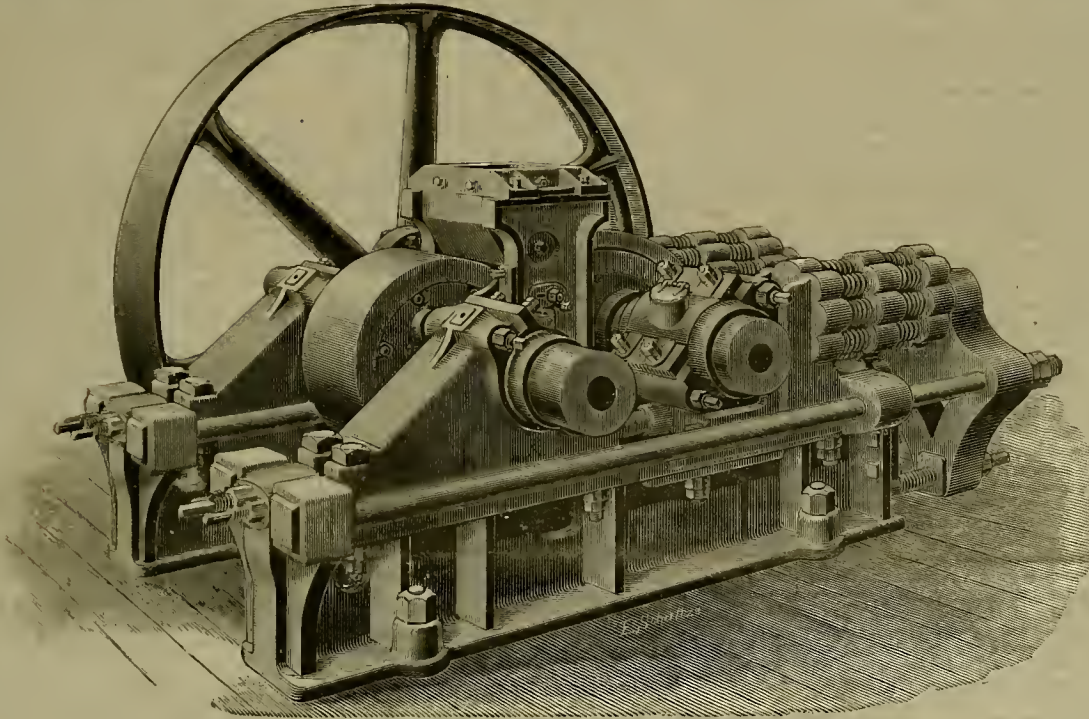
MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

VOL. LX.—Number 14.
DEWEY & CO., PUBLISHERS.

SAN FRANCISCO, SATURDAY, APRIL 5, 1890.

Three Dollars per Annum.
Single Copies, 10 Cts.



THE ECKART ROLLS FOR CRUSHING ORE.

The Eckart Rolls.

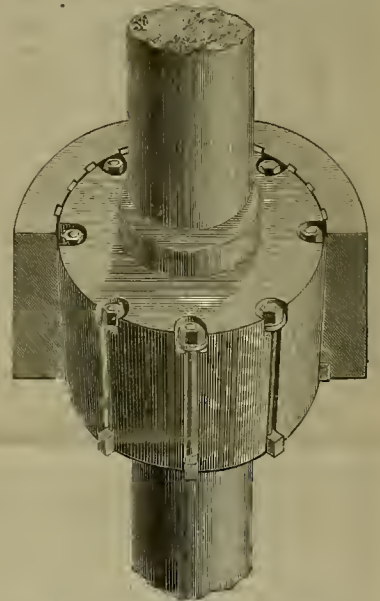
The Eckart ore-rolls shown in the cut are built for extremely heavy work by the Union Iron Works, and are strong and substantial in every way. The main shafts and body of the rolls are in one piece, with a hole cored through

the center. The hearings that carry one of the rolls are bolted to the bed-plate with oblong holes and can be set up by the set-screws shown in the end of bed-plate; while the hearings that carry the other roll are kept up in position by the double circle of steel spiral springs. The tension on these springs can be adjusted by

the bolts and the set-screws in the bottom of the cast-iron head. Large pulleys are keyed direct to the shafts, one on either side, by which the rolls are driven.

The smaller cut shows the way in which the white iron shell is held on to the roll. There are a number of wrought-iron strips cast on the

inside of the shell so it can be bored out. The shell is bored out tapering and the roll turned to suit. The roll is cored for the bolts as shown in the cut. The shell is also cored for the bolt-heads; and the shell is slipped over



SECTION OF ECKART ROLL.

the roll and drawn tightly up on the taper portion by the bolts, at the same time the heads of the bolts form so many keys. It is securely held and easily removed.

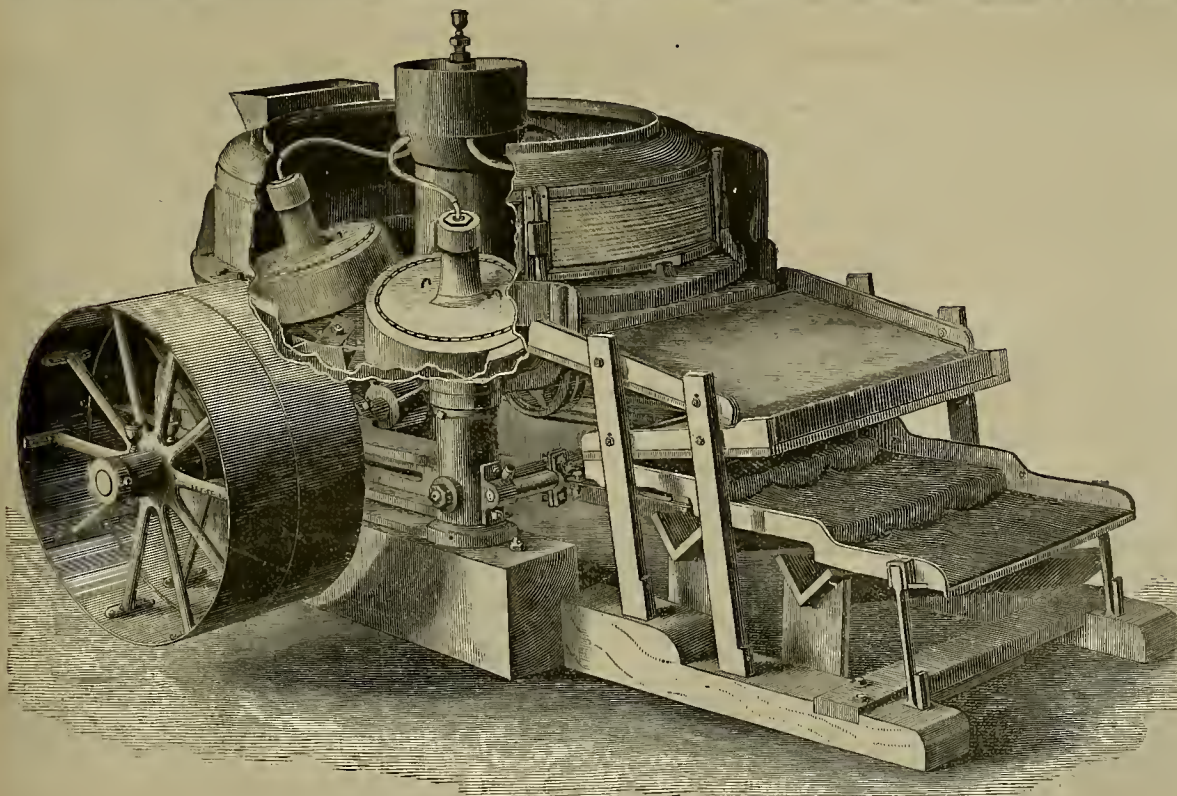
A New Centrifugal Quartz-Mill.

On this page is shown a view of the new centrifugal quartz-mill invented by Philip Hinkle of this city, and recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency. There is no oil used in this mill, the roller-shafts, slides and other inside working parts being lubricated with water. The engraving shows a circular supply-tank which is connected with the roller-spindles and supplies with water, by means of rubber hose, all the inside working parts of the machine.

The pan-bottom is cast with low flaring sides, within which is fixed a similarly-shaped flaring ring-die. The inner portion of the pan is made concave from below, and in the center is a conically shaped hollow sleeve through which the vertical driving-shaft extends. To the lower end of this shaft is secured the bevel-gear, which is set well up into the concavity of the pan, admitting of the pan being set very low. To the upper end of the vertical driving-shaft is fixed a carrier which extends down outside the hollow-shaft casing and is thence inclined outwardly so as to correspond with the inclined bottom of the pan. The carrier has radial slots formed in it which act as guides for the slides, which are fitted into these slots so as to move to or from the center as required. These slides serve to support the shafts, which are fixed in them and extend upwardly at right angles to the slides and within the inclined bottom of the pan.

Upon the tops of these guides are fixed steel plates which steady the sides, holding them in place and also preventing them from being clogged.

Upon these shafts are fitted the grinding roll.
(Continued on page 236.)



HINKLE'S CENTRIFUGAL QUARTZ MILL WITH PLATES AND "SLUMMER."

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

The Stewart Mining Bill.

A Defective Measure Criticized.

(Concluded from last issue.)

In making it imperative, under the penalty of forfeiture, that an affidavit should be filed for assessment work done on every mining claim, a heavy and needless burden will be laid on the prospector and moneyless miner if the proposed legislation is adopted.

Take the case of an illiterate man, who for years has been holding mining ground 20 miles away from a notary public, and 70 miles from the county seat, and generously and fairly consider how this requirement would affect his interests. He has been enabled in the past, perhaps, to do his work only by hiring himself out to some neighboring employer for low wages, his hope being that some day he will succeed in making a sale. In order to comply with the Stewart bill, he would be compelled to spend money and time in having affidavits prepared and recorded, and nobody would be benefited save office-holders.

If the purpose is to compel claim-owners to do their work and cease to relocate them, it is in one sense commendable enough, but it will not have that effect. On the contrary, it will increase relocating so as to avoid the additional expense, and Mr. Stewart and his restriction laws will be treated with jound derision. If a prospector fails to do his work, and his claims are known to be good, there are always men ready to take advantage of his delinquency, and if he is willing to risk the loss of his property, why should the law put him to a useless expense? Is the pre-emptor or homesteader of land required at the end of every year to file an affidavit as to his work? No; when he "proves up" in the Land Office, that is enough, and so when a lode is to be patented, the certificate of the mineral surveyor as to work ought to suffice.

If the owner of mining claims is able to file the necessary papers, by all means let him do it, but to decree a forfeiture of his rights, if the certificate as to work is lost on the way to the recorder's office, as would be the case under the Stewart measure, is unjust and cruel.

Another Unwise Proposal.

The Stewart bill, if passed, would make it legal to file affidavits relating to mining titles with local district recorders, in lieu of filing them with county recorders. The books of the former are usually kept in cabins where there are no safes, and in most districts the office is not long held by any one person. As such recorders are not under bonds and are not always reliable, the proposed jeopardizing of titles through the contingency of erased words, torn-out leaves or burnt books, is quite in keeping with several of the other "amendments" presented in this inexplicably strange effort at mining legislation.

A Change in the Tunnel Law.

Under Sec. 2323 of the present law a sort of tunnel charter is granted to miners, and by an amendment approved Feb. 11, 1875, work done in a tunnel was made applicable for assessment purposes to such lodes as it would develop. This amendment, however, was made to relate to Sec. 2324, and did not specify anything in regard to Sec. 2323. As Senator Stewart's bill amends 2324, it cancels the amendment of 1875 by the following substitute: "When any person or company has developed and exposed a lode, and expended a hundred dollars' worth of labor thereon, said person or company may run a tunnel for the purpose of developing such lode owned by said person or company, and the money so expended in said tunnel shall be considered as expended on said lode, and such person or company shall not thereafter be required to perform labor or make improvements on the surface of said lode in order to hold the same, so long as work is continued on such tunnel."

It may be well to give a copy here of the law now in force to show how a really good measure is to be "amended" out of existence by the Stewart scheme:

"Where a person or company has or may run a tunnel for the purpose of developing a lode or lodes owned by said person or company, the money so expended in said tunnel shall be taken and considered as expended on said lode or lodes, whether located prior to or since the passage of said Act, and such person or company shall not be required to perform work on the surface of said lode or lodes in order to hold the same as required by said Act."

The above enactment, it will be observed, is liberal. It in effect says to the mine-owner: If you want to concentrate your work for a number of lodes on a centrally located drainage tunnel, you shall be allowed to do so, and not be compelled to waste your time and money in digging useless surface-holes on your various claims. But contrast the Stewart tunnel proviso with the foregoing. Notice that it relates to one lode and no more, the effect of which limitation would be that if a tunnel was being opened for six claims, surface work would have to be done on five of them each year, no matter how far the tunnel had been extended in the interval. I have never heard of any complaint being made against the existing tunnel law, and why such a radical change should be pro-

posed is something of a mystery. Observe also what queer language our would-be law-maker employs. "When" a claim-owner has "developed" a lode—that is, when he has opened it—he will be specially permitted to run a tunnel for the purpose of "developing" or opening it. How liberal he is, too! "When" a person has spent a hundred dollars on the surface of one claim, he may then, but not before, begin a tunnel for it. When he has disbursed on a second lode one hundred dollars more, he will be allowed to begin a second tunnel, and so on, for every claim he owns he has the right conceded to him by our great law-giver of starting a tunnel for it.

This of course is all very absurd, but it is the proposed law, and not the interpretation legitimately belonging to it, which deserves to be so designated.

Further, let the reader notice what profound wisdom Mr. Stewart displays in the last nine words of his "amendment." The man who does not "continue" every day and every month in the year to work on each tunnel that he has begun is liable to have his claims "jumped," for their title is good only "so long as work is continued on such tunnel" or tunnels. Verily, the less a mine-owner has to do with a Stewart tunnel the better it will be for himself.

But can any sound reason be given for restricting tunnel privileges and rights to either one lode or even to five lodes? In all great mineral belts there are places where the veins fail to appear on the surface. Between two ore-bearing portions, five or ten miles apart on a given belt, there may be very little surface evidence to prove its continuity or value, and yet "indications" may be found to induce capitalists to tunnel some intervening mountain, in the hope of cutting concealed lodes.

Would not it be a wise thing to encourage a great prospecting work of that kind? The result of success would be the creation of a new industrial center and an addition to the available resources of the country. It would be the means of making a worthless mountain the source of wealth to individuals, to the nation, and the world at large. Our present liberal tunnel law gives that encouragement, and the time is coming when advantage will be taken of its liberality to an extent not dreamed of at present. But here Senator Stewart steps to the front, and with his one lode tunnel measure attempts to check mining enterprise. He is incapable of offering any adequate reason for the proposed change, and surely the miners whose interests are to be affected ought to be heard on the subject. It is wholly a retrograde movement which he has started, involving a total reversal of the heretofore liberal policy of our Government toward the mining community.

As our great mining interests are extended, a time will come when tunnels will be opened primarily for drainage purposes, as was the case with the Sastro tunnel, which, contrary to anticipation, is proving of immense advantage to the Comstock mining companies.

In a mountain where a dozen mining incorporations are operating there will be a time when water wholly unmanageable from the surface will have to be carried off by a union tunnel if further progress is to be made. Under the law as it stands now, united action and a general protection of separate interests would be assured in such a case, and an application for a special tunnel charter would be unnecessary. It is needless to describe how effectually the passage of the Stewart bill would cancel all such mining advantages and offer nothing in their place.

Another Bad Change.

The first part of Section 2335 of the proposed bill reads as under:

"All affidavits required to be made under this chapter may be verified before any officer authorized to administer oaths in any State or Territory of the United States, or in the District of Columbia, and all testimony and proofs may be taken before any such officer, and when duly certified by the officer taking the same shall have the same force and effect as if taken before the register and receiver of the Land Office."

The words in the above which I have put in italics are substituted for the following in the law of 1872: "Within the land district where the claim may be situated."

If there is a conflict of title now between a New York mining company and certain miners in California, testimony must be taken in the latter State, but under the Stewart bill the Eastern company could force their opponents to appear for the taking of testimony in any distant place they might choose to select. If a certain western land district is considered a good place in which to acquire mining property on behalf of distant capitalists, it ought also to be regarded as in every way a suitable locality to take testimony in relative to it. The contemplated change is entirely in the interest of non-resident mine-owners, and should it become a law it would involve local litigants in endless trouble and expense. Under it they could be worried and injured in a way which at present is impossible.

Stewart's Influence.

From the fact that Senator Stewart has been regarded as the author of the mining bills of 1866 and 1872, he has acquired an influence in Congress when he deals with mineral questions to which he is not justly entitled. This influence was shown on April 24, 1888, when the Senate passed the mining bill introduced by him on Feb. 7th preceding, without debate or protest. It seems as if this display of confidence made the Senator believe that the time

had come when he could erect a monument for himself in the form of a hill to govern the locating and working of mines about the authorship of which there could be no dispute. To attain his purpose he saw that it was necessary to lure mine-owners and prospectors to slumber by pretending that what he was attempting to do was in their interest, and necessarily, therefore, he would be glad of their aid in enabling him to produce a "perfected" measure. That he meant from the first, and means now, to force a bill entirely of his own concocting on the country, before his plans could or can be exposed, is shown in every step that he has taken. A critical examination of his bill proves conclusively that he could not be and was not the author of the laws of 1866 and 1872. The master mind, which left its impress on these measures, and particularly on the latter, was that of a thoroughly practical miner and prospector, who could foresee how every requirement he suggested would work when applied in the field. He probably was some humble, unknown pioneer in whose judgment and proposed enactments the framers of those measures had full confidence, and hence the general working excellence of the existing law. But the self-confident law-maker of to-day will take no advice and dashes ahead seemingly unconscious of the fact that he is displaying in the sight of practical miners his utter incompetency to deal with the subject in regard to which he professes to be a master.

The Few Defects

In the law of 1872 are too insignificant to warrant the complete overhauling which Mr. Stewart proposes to give it. The rulings of the Land Office and decisions of the courts are so generally understood and recognized that to unsettle them by new enactments couched in uncertain language would be a heinous blunder. If it cannot be perfected by a few short amendments but must be tinkered at all over by an unskilful hand, it will be better not to touch it at all.

Some of the Stewart proposals are good, but they are too unimportant to redeem the bill as a whole from condemnation. His plan to make the assessment year begin on October 1st is commendable, as also his provision that ore-bearing rock in place should be held as affording satisfactory evidence of land being mineral in character. In giving right of way to tunnels, canals and ditches through or over adjoining claims, he also made a good proposal. These are trivial matters, however, whereas the changes attempted in other parts of the law are so radical that they would, if adopted, destroy its most liberal and beneficial features.

Suggestions to Miners.

In this long article I have tried to deal with the Stewart bill so that readers of the PRESS, practically interested may know just what it is and act accordingly. If I have made it plain that the passage of the measure would be injurious to our great and growing mining industry, steps ought to be taken at once by miners' meetings, by appealing to local journals, by petitions, and by bringing pressure to bear on members of Congress to oppose and defeat it.

If the PRESS will, as the miners' organ, enable me to bring the case before the public, I have confidence that Senator Stewart will be made to understand that as a single-handed legislator capable of going down into the lower levels and drifting along the subtle veins of our mining policy he is anything but a success.

General Summary.

The Stewart mining bill ought to be rejected for the following valid reasons:

1st. It prevents a discoverer even of a new mining district from locating more than one claim on a lode, and gives loafers a chance to locate extensions and wait for him to develop a mine for their benefit. It also prevents him from meeting the demands of capitalists for groups of claims which can be opened by central works and where litigation by adjoining claimants would be impossible.

2d. It prevents a miner from correcting a defective location by making a re-record, and invites "jumpers" to hunt up and relocate all imperfectly described lodes.

3d. It does away with the requirement now in force, that a location should be so described relatively to fixed natural objects as to prove its whereabouts, and substitutes an indefinite description, which, if adopted, would admit of "floating" claims being taken up such as were productive under the law of 1866 of endless litigation.

4th. It entirely relieves the rich man who spends \$1000 in some undescribed way for the benefit of five placer claims each of 160 acres, or of an equal number of lodes, from working on any of them, whereas the poor prospector who does not possess that sum or cannot undertake so much work, must do \$100 worth of hole-digging labor on each of his five ledges or his title thereto will lapse.

5th. It changes the present law which most beneficently gives the owner of a series of veins the right to concentrate his work in a tunnel, or on one of them, and substitutes a measure under which credit for assessment labor in a tunnel would be allowed for one lode and no more, and surface work would have to be done on all the others of the series, even if during the year there had been a thousand feet of tunneling done for their development.

6th. It requires under the penalty of forfeiture that every claim-owner, no matter how far he may be from a notary public or the

county seat, should record an affidavit for the annual work done on each of his lodes, and if such affidavit is lost on the way to the recorder's office, the claim it relates to will be subject to relocation.

7th. It proposes to legalize records as to forfeited titles and affidavits when they are made with local mining recorders, thereby ignoring the fact that such records are liable to be burnt, lost, or changed, and that mining titles might in consequence be imperiled.

8th. It will enable mining incorporations in distant States to compel litigants in the mining districts where they are operating to appear wherever they are pleased to command them for the taking of testimony, whereas at present this must be taken in the land district where the mines are situated; and

Finally. The changes proposed in the mining statutes by Senator Stewart would, if adopted, not only promote litigation, but would compel the Land Office to issue new rulings and would also keep the courts busy for years to come, trying to discover their meaning. In place of improving the present law, they would greatly injure it and check mining operations. Should this measure pass, it requires no prophetic power to foresee a time, not far off, when the cry for its repeal would prove irresistible. JOHN DARE EMERSLEY.

Gold in White Pine, Nev.

A correspondent of the Salt Lake Tribune, writing from Ely, Nev., says: The Johanna mine, the property of H. R. Watson, is situated about two miles from the town of Ely, up Robinson Canyon, and is just on the north side of the old Aulman mine, and it is just one mountain of gold-bearing ore, with not over three feet of lime and soil on the top of the ore. I have worked in the Richmond mine in Eureka in its best days, in 1873 and 1874, and I assure you I never saw as large a body of ore in it as is this day in sight in the Johanna, and the beauty of it is the ore is right in the side of the mountain and can be mined very cheaply. The price of extracting the ore at the present time does not exceed 50 cents per ton. What ore is needed at the present time, 35 tons per day, is taken from two tunnels. One of said tunnels is running up the canyon to the west, the other right into the mountain to the south. Each of said tunnels is 10 feet high and about 10 feet wide. The ore is very heavy in iron, with seams of quartz and carbonate, no lead, and is working up to 90 per cent with a 10-stamp gold mill. The mill is situated in the town of Ely, and is run by a water-wheel. The mill is rented by Mr. Watson for \$16 per day, by the way, a nice income to its owners. The battery assay of the ore is \$22 per ton in gold, but right in the center of the Johanna and dipping to the east or down the canyon is a seam or small ledge of ore that is enormous in richness. I myself from a small pan of dirt have taken over \$5 in gold. I visited some other mines in this district, and I never saw more favorable prospects in my life. But the most of the ore I saw outside of the Johanna is rebellious, and, in my opinion, cannot be handled by a milling process. What is needed in this camp is a large furnace and an able management that will purchase ore from us prospectors and give us living prices for our ores, and I know from what I saw of the mines there are thousands of tons of lead ore that can be purchased very cheap here that will pay large profits to a smelter, and coal can be had for several years within ten miles of the town of Ely.

FOR THE LICK TELESCOPE.—The Lick telescope will, in a few weeks, be supplemented by a remarkable piece of mechanism. This is an eye-piece which has just been completed at Rochester, N. Y. No other eye-piece of anything like equal dimensions has ever been made. The largest now in use is not over two inches in diameter, while the new piece measures over three inches. The eye-piece is constructed on a perfect theory. There are two lenses, six inches apart. The larger one is called the field lens, and is 6½ inches in diameter. The other lens is the eye-glass proper. It is composed of three lenses, a double concave, a double convex and meniscus, cemented together. The field lens is of brown glass. The meniscus or correcting lens is of flint glass. The light from the heavenly bodies seen through the Lick telescope with this new eye-piece will be 2000 times as bright as that seen with the naked eye.

A MINING BOOM.—A mining boom is reported in Singapore. In the river Luait, in Pahang, large deposits of placer gold have been found. The percentage of gold-dust in this spot has made an average of 60 to 70 ounces per cubic yard. The mineral is pretty largely in flat formation and of a reddish color. Pahang has long been known as the richest of the Malay provinces in gold, and it is predicted that shares in this concession, which are now selling at \$10, will reach \$1000.

ON the authority of the London Times the vein of uranium recently discovered in Cornwall, England, the works for reducing the ore are turning out half a ton per week of that rare metal, the market value of which is \$2000 per ton.

THE placers on Lee Vining creek, near Lundy, are to be worked by the hydraulic process this summer.

The Deep Gold Placers of California.

NUMBER 1.

[Written for the Press and Copyrighted 1890, by HENRY G. HANKS, F. G. S. A., F. G. S.]

This paper has been prepared to advance a new theory as to the origin of the deep placers of California, which is presented as a substitute for the ancient-river theory, found to be defective. While it seems to me to account for nearly all known conditions, it will doubtless in time be modified as new facts are discovered. If it should renew attention to the unexplored storehouses of gold which exist in our State, and lead to a more careful study of their geology, its object will be accomplished.

The Ancient-River Theory.

From the date of their first advent, the gold-miners of California began to theorize as to the source of the gold they were seeking. Many believed in a distant fountain-head, difficult of access, high up in the snowy mountains, where virgin metal lay in a natural treasury as Nature created it, from which the nuggets and gold-dust they gathered with so much toil, had wandered.

With this idea always in view, they were the more ready to believe stories rife in those pioneer days. This accounts for the historical gold excitement and mad rushes, of which Gold Lake, Gold Bluff and Frazer river were types. These and many more will be remembered by pioneer California miners.

The Australian gold-digger, like his Californian prototype, believed that a locality existed where gold could be cut away with chisels, and he sought it with the same visionary energy that led to the swarming of miners to newly discovered gold-fields.

Beside their camp-fires, after the toilsome labors of the day, miners would speculate also as to the origin of the gold, and plan to overcome the difficulties which lay in the way of its possession. So miners and prospectors continued to day-dream and theorize, nor will they cease to do so as long as gold-mining continues.

Among the numerous ones advanced, that known as the "Ancient-river theory" has been most generally accepted. But as the auriferous deposits became better known, many objections were noted, and it is uncommon at the present time to find an intelligent miner who does not wholly reject it or retains it with doubt. It will not add to the interest of this paper to repeat what has been so often published; the main features of the theory, however, may, for the benefit of those not familiar with the subject, be briefly stated as follows:

The old river theory assumes that during the Pliocene epoch, or earlier in the Tertiary period, the climate of this portion of the earth's surface being favorable, great rivers, as large as the Mississippi, the Ganges or possibly the Amazon, flowed with great rapidity, at an altitude now about 5000 feet, whatever it might have been at that time, and brought from some far-away, mythical source a vast quantity of gold, associated with fragments of quartz which the waters are supposed to have torn by sheer force from their natural beds. These quartz fragments, and the silts resulting from their disintegration, were generally blue, which gave the name "the blue lead" to the deposits. The tumultuous waters ground the rock masses to boulders, in which form we find them where the rivers finally placed them with the gold.

While the rivers were thus employed, their waters were in a turbid condition from gravel, coarse and fine, held in suspension, which was precipitated on the boulders. The streams, then, for reasons not fully explained, ceased to exist and became "dead rivers."

A period of great volcanic activity followed, and the surface of the country including the dry river beds was covered by an inundation of red-hot, liquid lava. The volcanoes from which these eruptive streams flowed are variously located; some theorists naming Mount Shasta, others Mono lake, while still others trace the lava streams to distant Alaska and refer as evidence to the basaltic cliffs of the Columbia river.

It is my opinion that evidence does not warrant the retention of this theory.

The New Theory.

In the MINING AND SCIENTIFIC PRESS of June 29, 1889, I published the following preliminary notice, which briefly states the new theory:

GOLD IN DEEP PLACERS—A NEW THEORY OF ITS DEPOSITION.

EDITORS PRESS:—During a recent visit to the drift-mining districts near Laporte and Gibsonville in Plumas and Sierra counties, I made certain discoveries which suggested a new theory as to the deposits of heavy gold and worn quartz boulders lying invariably beneath lava ridges, which to my mind must replace the ancient-river theory so long held in California. This theory was foreshadowed in my second annual report as State Mineralogist, 1882, folio 98.

I have in preparation a paper which it is my intention to publish in the PRESS with illustrations, giving my reasons for so thinking. I send you this preliminary notice to secure priority.

The substance of my theory is briefly as follows: The channels are lake-beds scooped out by glaciers that in course of time retired to mountains of greater altitude, continued their work during a long period, and finally became extinct.

The bedrock at this locality being soft clay slates, mica schists and argillaceous shales filled with small quartz veins containing gold, was reduced to mud and washed away, leaving the harder quartz in rounded boulders with the coarse gold in the lake-bed,

which was still filled with water. Rivers like the Rhone in Switzerland, brought down from the still active but distant glaciers, crushed quartz, and for many centuries deposited it in the lake, covering the bottom with what our miners call "pipeclay." The lake and the low mountain-tops were subsequently covered by an overflow of eruptive mud, the so-called lava. Modern rivers which still flow in their channels, cut down through the lava, the gravel deposits and deep in the soft underlying bedrock. That position between the rivers protected by the lava became rounded ridges, and a portion still left as a floor remaining on the summits of the mountains are "table mountains." The channels so called are the intact lake-beds and the present drift mines. The new river channels are the placer mines of the forty-niners and hydraulic mines of past history.

It is my opinion that the contents of the channels came from a small area, and were not brought from a distance, as generally supposed. The blue quartz which imparts a general character to these deposits I found in place near Gibsonville, as I did also all the boulder rocks common to the deposits.

That there were numerous lakes of this character I am prepared to believe, but on reducing the lake of Geneva to the same scale as my map, I find it to extend from Pilot Peak to Nevada City, and to cover most of the important drift and placer mines between those two points.

Assuming that such a lake existed, I have named it Lake Tra-la, from the first State Geologist of California, who made this subject a special study and nearly discovered the facts to which I allude.

HENRY G. HANKS.

Figs. 1, 2 and 3 are ideal sketches made to illustrate the new theory. In these, perspective has been disregarded. Fig. 1 is a view of the ancient lake, left by retreating glaciers still active in the distant mountains. From the surface of the lake downward is in section. The irregular, deeply-channelled lake-bed was scooped out by the ice is thus shown; it is supposed to be strewn with quartz boulders, among which lie scattered the native gold. During this period the pipeclay and fine gravel were deposited.

Fig. 2 is the same lake-bed now covered by earthy eruptive matter (A), the so-called lava. From the surface of this formation downward is in section; under the lava the lake-bed is shown (C).

Fig. 3 shows the result of geological changes which have produced present conditions; modern rivers have eroded the channels B B B now deep in the bedrock, in which pioneer miners first sought gold; C C is the same lake-bed now filled with material described elsewhere; D D are portions of the lava intact, forming table-mountains; E is a rounded ridge of the same; F F F F, placer and hydraulic mines; and G G G G, drift mines reached only by tunnels.

It will now be my purpose to give in detail the reasons which led me to draw these conclusions.

Arguments Advanced by the Ancient-River Theorists.

It is claimed that rivers flowed in the ancient-river channels because pot-holes are found in the exposed bedrock of the hydraulic mines and in the tunnels and breasts of drift basins; for the reason that magnetic sands are seen to have collected under the lee of large boulders lying on the bedrock; and because these boulders sometimes overlap like shingles on a house-top, the small ends pointing generally down the grade. The washed or rounded quartz boulders, the gravel, the pipeclay, the silicified and carbonized trees in the gravel-banks, and the gold itself, are assumed to be evidences of fluvial deposition.

It is also argued that the numerous writers on the subject could not be mistaken; these authors will be quoted when it is desired to inform the reader upon what grounds their opinions were based. It will be shown that all the facts stated above may be freely admitted without detracting in any degree from the validity of the new theory.

W. A. Goodyear, in an article in the *Mountain Democrat* quoted in the MINING AND SCIENTIFIC PRESS, Vol. 23, 1871, fol. 329, wrote as follows: " * * * There is but one possible agency which is at all capable of satisfactorily accounting for the complex and intricate phenomena, and that this is to be found the action of fresh and running waters." * * * These views will be thoroughly discussed in the forthcoming report of J. D. Whitney.

Prof. J. D. Whitney ("Auriferous Gravels of the Sierra Nevada of California," Cambridge, 1880), fol. 241, thus strongly expresses an opinion, the exact reverse of mine: "The gravels were then, as now, the result of fluvial action. The rivers which did the work of rounding and polishing the innumerable boulders and pebbles which these older deposits contain are doing the same thing now, although with diminished power." Fol. 294: "The main results which have been attained in the exploration of the high gravel deposits of the Sierra Nevada are these: That these detrital masses are the work of rivers which are of Tertiary age, as will be more fully set forth," etc. Fol. 295: "Again, it is perfectly clear that the shaping of the surface of the bedrock and all the erosion which has taken place since the beginning of the gravel epoch have been exclusively the work of water." * * * It can be set down, however, as established beyond any possibility of doubt, that ice had nothing to do with any part of the erosion of the gravel period."

These extracts are given to show that I am not ignorant of the opinion of Prof. Whitney, which, however, does not prevent me from adhering to my own, the result of long study of

the subject, the localities and the auriferous deposits in detail.

Arguments Against the Ancient-River Theory.

Dr. J. B. Traak, the first State Geologist of California, was the first to advance the ancient or dead-river theory, although, like all other writers on the subject whose works I have consulted, he soon found reason to doubt it.

In his "Report on the Geology of the Coast Mountains, Assembly Document No. 9, 1854," on folio 62, may be found the following: "From the examinations that were made on this range there are abundant evidences that an ancient stream flowed through this section of the country and in a parallel direction with its then existing mountain ridges, and the extensive mining operations conducted in the southeast part of Sierra county on this range have been the means of demonstrating this fact."

On folio 64 he calls attention to certain facts strangely at variance with this theory, as follows: "The organic matters deposited are perfect in their forms, the most delicate parts of leaves are truthfully preserved to nature, the material in which they are imbedded is that usually found suspended in waters that were but slightly disturbed, and when disintegrated, yields an almost impalpable powder. Not a pebble nor even coarse sand is to be found in any part of it. In fact, every feature that would indicate a quiet state of waters is fulfilled in the section under consideration."

Folio 61, he traces the placer deposit 70 miles and assumes it to be four miles wide. This report was written in 1853, and presented to the Legislature early in 1854.

William P. Blake, 1854, visited the mines at Mokelumne Hill and the mining region near Georgetown, and wrote as follows ("Geological Report, Explorations and Surveys from the Mississippi River to the Pacific Ocean, Pacific Railroad Reports," Vol. 5, fol. 273): "It would appear from this section that there was an alternation of quiet and running waters. The deposition of the clay and pumice was interrupted by a swift current bringing gravel and gold, and this current was probably similar to that which first spread the gold on the uneven surface of the alluvium. It is probable, also, that the current was sudden and powerful, for if it had flowed for a long time, the clay would have been swept away before the gravel was laid down. The gravel must have accompanied the flood, and this acted as a barrier to the denudation of the layer of clay below." Fol. 277: "The river drift containing gold appears under a variety of forms. It may be either coarse or fine, but is found in all ages from the accumulations now forming in the beds of streams and on bars to the deposits of rivers which formerly flowed over the surface 2500 feet higher than now. The courses of such ancient streams are discovered by the miners and followed by them in their underground explorations. All the peculiarities which the beds of rivers present, the water-worn surfaces, pot-holes and some scale gold are found in them."

Since I commenced the preparation of this paper, I became aware of the fact that Prof. Newberry, as early as 1857, was of the opinion that the auriferous beds of California lay in ice channels. (Annual of Scientific Discovery, 1857, fol. 327.)

These authors were followed by others, and the theory was assumed rather than proven. The following are among the numerous persons who have written on this subject:

Charles S. Capp, Letters to the San Francisco Bulletin.

J. D. Whitney, Geological Survey of California, 1861-1864.

James Hector, M. D., Quarterly Journal of the Geological Society of London, Vol. XVII, 1861.

P. Laur, Report on the Production of the Precious Metals in California to Minister of Public Works, Paris, 1862.

Titus Fey Cronise, Natural Wealth of California, San Francisco, 1858.

J. S. Hittell, *Overland Monthly*, Vol. 1, San Francisco, 1868.

J. S. Hittell, Resources of California, San Francisco, 1879.

Joseph LeConte, On the old river beds of California; *American Journal of Science*, Third Series, Vol. XIX, 1880.

J. D. Whitney, Auriferous Gravels of the Sierra Nevada of California, Cambridge, Mass., 1880.

Andrew Larsen, MINING AND SCIENTIFIC PRESS, Vol. XLII; reprinted in Production of Gold and Silver in the United States, Burchard, Washington, 1880.

C. J. Brown, MINING AND SCIENTIFIC PRESS, Vol. XXXI.

James J. McGillivray, MINING AND SCIENTIFIC PRESS, Vol. XLII.

R. Chisholm, Natural System of Volcanic Rocks; Memoir California Academy of Sciences, San Francisco, 1868.

W. A. Goodyear, Paper read before the California Academy of Sciences, and published in the *Evening Bulletin*, San Francisco, Vol. XLVIII, No. 140.

C. J. Brown, Mineral Resources of West of the Rocky Mountains; Raymond, Washington, 1877.

Henry DeGroot, Second Annual Report State Mineralogist of California, Sacramento, 1882, Appendix, fol. 134.

An article on the origin of ancient rivers, by "Old Sierra," appeared in the MINING AND SCIENTIFIC PRESS, Vol. 19, August, 1869, fol. 130. After describing the different varieties of gravel deposits, the writer thus continues: "These two kinds of cement conglomerates cover a vast portion of Central Plumas county and parts of Sierra and Placer counties, and present unmistakable evidences of the bed of a great lake, or chain of lakes, forming the west-

ern border of a chain of volcanic basins to the east, the source of the old river channels."

John S. Hittell (*Overland Monthly*, Vol. 1, 1869,) contributes an able article on the dead rivers of California, in which he advances, as far as known at that day, all the arguments in favor of the old river theory; but while the reader is referred to the paper for much valuable and interesting information on the subject, I am constrained to disagree with Mr. Hittell and call attention to certain incongruities in the paper referred to. Admitting his facts to be indisputable and his descriptions admirable, it is only his conclusions to which I take exception.

He states what is understood by a dead river, shows that at the time of writing they had produced \$300,000,000 in gold and were yielding at the rate of \$8,000,000 annually; that the blue lead could be traced 65 miles and must have flowed many hundreds of miles; the elevation of this channel was 5000 feet at the highest point, 2800 feet at the lowest, a grade equal to 33 feet to the mile. After asking the question, "Whence comes all the quartz of the blue lead?" he replies: "It came from the far North. The immense size of the boulders implies a mighty current; these in the lowest stratum average in some places a ton, and many are found of 20 tons; they are not found here and there, scattered as though they had tumbled down from the banks of the river near where they were found, but they are evenly distributed in a stratum of equal thickness across the whole bed and for miles in length."

Dr. Henry DeGroot, a fine writer, close observer and firm advocate of the old-river theory, contributed an appendix to the Second Annual Report of the State Mineralogist of California, 1882. After accurately describing the channels which he asserts were old river-beds, like other authors on this subject, he proceeds to call his own conclusions in question in a number of instances. On fol. 144 he writes: "Viewed as a whole, this old river system with its short main trunk, its long branches and their ramifications, presented much the appearance of a wide-spread oak." * * * "The most of these departed rivers were, in fact, exceedingly crooked—so much so that their numerous and violent sinuities, by creating the appearance of parallel channels in close proximity to each other, have led some observers into the mistake of unduly multiplying their number. At several points along them this feature becomes strikingly apparent. How devious must have been the course of the main south trunk along that portion of its route reaching from Gold Run to Quaker Hill, is disclosed by the fact that it ran, or is supposed to have run, through all the leading mining camps between those two places. As its passage through these several localities would render the course of this great south artery a perfect plication, there is warrant, perhaps, for assuming that there occurred at this point a network of these ancient channels, a number of them having come in from various directions and centered here, this being more reasonable than to suppose that the main trunk pursued a course so exceedingly tortuous. Elsewhere this stream, as laid down on the map referred to, would have appeared to have followed a course equally capricious, running within a linear stretch of a few miles toward almost every point of the compass."

When the Second Annual Report of the State Mineralogist was published, 1882, I accepted the popular theory under protest, although certain discordant facts had even then been discovered, as the following quotations will show:

Fol. 95: "This interesting subject is mentioned here in this general way to show that the gold in our gravels is derived from the bedrocks and probably not from outside sources. The quartz veins in metamorphic rocks, called in California 'bedrocks,' were broken and worn by the erosive force of the ancient rivers, by glaciers, and by forces lately noticed and yet to be mentioned. The smaller fragments were crushed to sand, while the larger became the quartz boulders so common in the hydraulic mines. In this disintegration process, gold in quartz veins was set free, while other metals, as lead, iron, copper and zinc, yielding to the action of the elements, changed to compounds and were lost to view. Ice very probably had much to do with the disintegration of the rocks in ancient times. Some phenomena have been observed which can in no other way be explained."

Fol. 96: "I have reason to believe that we have been generally mistaken as to the genesis of the auriferous gravels in the beds of ancient rivers; for river-beds they are, without a reasonable doubt. But the theory that these immense bodies of gravel were deposited by a great flood, by a series of floods, by long deposition or by the rivers themselves, does not account for the gold in them. The microscope seems to show that they are not river sand at all and have never been far removed from the place that gave them birth. I have examined samples from many localities, including some of the most noted hydraulic mines in the State, and the result is invariably the same. The sand grains are all sharp and angular, and not at all worn as are those from the seashore, the great Colorado desert, the agricultural soils, and the beds of the present rivers. To verify these results, I pulverized quartz on an iron slab to different degrees of fineness and examined it under the microscope, finding it identical with the sands from the gravels of the gold placers."

Fol. 98: "No observant person can study these sands under the microscope without feeling that he is looking at the ruins of the rocks. There can be no doubt that each little grain owes its condition to some powerful cause which has acted on larger rock fragments or formation with sudden force, and that the sands are not the result of slow disinte-

(Continued on page 237.)

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Cor. Amador Ledger, March 29: Contract work at the Lincoln mine is finished, and the men now at work taking out ore. The mill was started last week and Mr. Stewart feels confident of being able to keep it running steadily all the summer. W. E. Darrow of New York Ranch and J. Bawden of this town have charge of the mill, and whatever gold there is in the rock they will be apt to get. Drifting at the North Star is still in progress, with nothing new to report. Unless something is encountered shortly, sinking will again be resorted to.

COSMOPOLITAN.—Amador Ledger, March 29: The ore crushed from this mine so far has not come up to expectations. Indeed it has fallen considerably below paying expenses. What the exact yield per ton has been we are unable to say, but the fact that the mill has been brought to a standstill, after running long enough to test the quality of the quartz at present in sight, is sufficient proof that it fell short of the paying standard. The owners, however, are determined to do considerable prospecting. They have a long stretch—two full claims—along the mother lode, and in this territory there is no reason why they should not encounter good pay ore. A drift is now being run north to tap a large ledge, the croppings of which show very strongly on the north side of Dry creek. The distance to be run is several hundred feet, and it will take some months to reach the desired point.

LOYAL LEAD.—Active work has been resumed on this mine, situated in the Black Hills country, near the Gover. This week G. R. Breese sold the greater part of his interest in the property, retaining half a share, or one-fortieth interest. The mill is to be put in running order and started up as soon as possible.

REEVES.—This mine is owned by the five principal stockholders of the South Cosmopolitan Co. The 20-stamp mill is running steadily. No regular cleanup has been made as yet, but from the amount of gold obtained from the plates, the owners are sanguine that they have struck a good thing. The claim is located about a mile north of the Cosmopolitan.

MISCELLANEOUS.—Another cleanup has been made at the McKenzie Bros.' mine at Irishtown, which turned out as satisfactory as the last. It is pleasing to be able to report a paying mine in operation in this district. It is a region where Nature has scattered large quartz deposits, and the fact of one paying property in activity will encourage other mine-owners in the locality to start their claims. It is confidently believed that a fair amount of prospecting would result in a number of good mines being opened in this vicinity. The McKenzie claim was closed for a few days this week, waiting the arrival of some castings for the mill from San Francisco. The Kennedy, we are pleased to state, is looking better than at any time since the present company took hold of it. The ledge at the lowest levels is turning out some fine rock, keeping the 40-stamp mill in steady operation. Altogether the prospects of the mine have greatly improved by the last sinking.

Calaveras.

MURPHYS.—Cor. Calaveras Prospect, March 29: Preparatory arrangements are seen at all points of the compass, in this district, for an active season in mining matters the coming summer. Considerable prospecting is being done now that the weather has become more settled, and we look for better and more prosperous times to succeed the extraordinary dull spell just passed through. At the Norfolk mine an increased number of miners have been put to work in the underground works, and the compressor is kept in constant motion. The Total Wreck Co. has its mill ready for crushing, and it will soon be in motion. Much is expected from this mine, as a number of tons worked in the Oro Plata mill has given a high average. Mr. Campbell of San Francisco, the owner, is expected here soon, to be present at the starting up of the mill. He is highly elated with his purchase. The Morse gravel mine on Central Hill, once so famous for its enormous yield of gold, is in full operation, and a vigorous prosecution of work is the order now since the advent of good weather. At the adjoining mine of Wm. Thomas & Co., where the recent fatal accident occurred, causing the death of R. Roberts, they are busily engaged with the surface diggings on their immense gravel claim. The different mines in the Stanislaus region are now inert; one vast sheet of snow still blankets that whole district. When the snow shall have disappeared, a party is expected up from below to take hold of the property.

Inyo.

CERRO GORDO.—Inyo Index, March 26: A correspondent sends the following items of interest from Cerro Gordo: Generally dull at present. A few mines are prospecting in the Union at the 400 and 700 levels. John Thomas and Wm. Crapo both have good prospects. Thomas has sunk 40 feet and has taken out a few tons of high-grade lead ore. Crapo is working on his prospect, about 300 feet south of the Union, which has every indication of a large body of ore.

ANTIMONY.—There is probably no place on earth where antimony so abounds as in the region bordering Death valley. The section referred to embraces southern Esmeralda, eastern and southeastern Inyo and northern San Bernardino counties. Near Panamint in this county, which is about the center of this great mineral belt, antimony predominates. A prospector who made a recent location there, in Wild Rose district we believe, informs us that the surface of his claim is covered with immense howlers of antimony that assay 60 to 80 per cent in that metal, and that thousands of tons of it lie there exposed, requiring only to be broken and sacked and a means of transportation. In fact, the latter necessity has been the one drawback to the development of that great mineral region. Perhaps the sudden appreciation in the value of antimony may result in turning the attention of capital in this direction. Only a few weeks ago some parties from Los Angeles bonded a number of antimony locations in the Death valley section, said to be in the interest of an Eastern or European syndicate.

Nearly all ores found in this county carry more or less of antimony.

MINING PROSPECTS.—Andy Fyffe, superintendent of the Kinkadee M. Co., says it is the intention of the company to ship in machinery as soon as the new wagon-road is completed. They will put up an 80-ton water-jacket furnace. We are under obligations to Jas. C. Crocker for mining news from that section of the country. Mr. Crocker has all through the mines. They had sunk a new shaft 80 feet deep, in ore all the way which averages \$45 per ton in silver and 64 per cent in lead. The red oxide iron ore goes \$81.80 per ton in gold. The ledge has been traced for 15 miles, cropping out most of that distance. They have an abundance of wood and water near the mines. Mr. Fyffe says he can furnish charcoal at eight cents per bushel by putting up large ovens. There are a great many prospectors at work in that district already. We also learn that there have been several other properties there bonded to San Francisco parties during the past week. Mr. Fyffe told Mr. Crocker he thought there would be 500 men at work in that district before next fall. Sam Piper has made a very rich discovery in this county, about 10 miles northeast of Gilbert's ranch, near his old arastra. He has two men at work and has run a drift in on the ledge about 40 feet. The ledge is 30 inches wide and assays \$70 per ton in gold. So Inyo county is coming to the front once more, and will receive a benefit also on completion of the road to Esmeralda county, Nevada, which has yielded up her millions and has billions left for honest toil.

SALINE VALLEY BORAX DEPOSITS.—Cor. Independent, March 28: The borax deposits in Saline valley extend over a portion of four townships. The principal portion of the borax deposit is in the northwest part of township No. 14 S. R. 38 E. The marsh portion of the valley has an area of from 25 to 30 square miles. The best portion of the deposit is at the southwest border of the valley and has an area of two to three square miles. This is the lowest point in the valley, the altitude being about 1100 feet. The borax belt and a soda belt cross each other at this portion of the valley, forming the combination known as borate of soda. The course of these belts, as near as I can determine, is: soda, north, 20° east; borax, north 20° west. The deposits of borate of soda found on the west side of the marsh are heavy and rich, but not regularly distributed over the surface. This indicates that the deposits have been formed by water running in a number of channels, or "washes," from the northeast to the southwest side. The deposit on the east side of the marsh extends for a distance of four to five miles in a northwesterly and southeasterly direction and is rich in borax and very evenly distributed. When the borax found on the surface is removed, another deposit speedily forms which seems, judging from ordinary tests, to be as rich as the original deposits. At the northeast edge of the marsh there rises out of the bedrock a number of springs, the water of which is strongly impregnated with boracic acid. The water from all these springs quickly sinks into the marsh, the flow being strongest from October till April of each year. The belts of borax and soda already spoken of, in their course southerly are far separated at the extreme south side of the valley, and on that side of the marsh is found a deposit of borate of lime, more commonly called "cotton-ball." The supply of wood and water in the valley is abundant. In my judgment there is not a place in the United States where borax can be got at so small a cost as in Saline valley. Messrs. Conn & Trudo have made a fairly good road from their works in Saline valley to Alvord station on the C. & C. railroad. The length of the road is 45 miles.

Mariposa.

THE WHITLOCK MINES.—Mariposa News, March 29: The season opens with bright prospects in the quartz-mining industry over in the Whitlock mining district. Ellingham & Grove have purchased the 5-stamp mill formerly owned and operated by Dr. Robinson on Sherlock's creek, between White's Flat and the old camp, and will remove it to a convenient point on Whitlock's creek, at the site occupied by the little prospecting mill. They have about 1000 tons of milling ore on hand ready for crushing. Heisser & Peregov have a splendid prospect in their claim near Ike Lyon's place. They sunk a shaft 50 feet in depth and run a cross-cut developing a vein of about 9 feet in thickness, showing free gold as well as rich sulphurets, and are now crushing the ore at the prospecting-mill of Ellingham & Grove. In the opinion of men who have good judgment, based on experience in mining and milling, the ore now being crushed will yield about \$20 a ton in free gold. If there has been no mistake made in the assays of concentrated sulphurets and in figuring the estimates of the percentage contained in the ore body, the gross yield per ton will aggregate something over \$100. Mr. Grove thinks this mine is going to develop a bonanza. N. J. Farrens is at work on the Bull Dog vein which showed up in good form last year. From a crushing of five tons of quartz a little over \$55 was obtained. Since the above was in type, Messrs. Peregov and Heisser came in from Whitlock's and reported the result of their cleanup. They crushed 17 tons of quartz which yielded, in free gold, 18 ounces and \$10, which is within a fraction of the previous estimate of \$20 per ton. They estimate the sulphurets to amount to one per cent of the ore body. Sample assays show a yield of \$11,000 to the ton of concentrated sulphurets. They have from 300 to 400 pounds as the result of their late work and will ship them below for a practical test. In crosscutting the vein they ran 7½ feet and were not through it when the winter storms drove them out. The body of sulphurets ore was five feet in thickness. Everything confirms the truth of the statement, based on estimates made by practical miners and a personal knowledge of that district, that this is a mine and Whitlock's will soon come to the front as a lively mining camp.

DILTZ MINE.—Cor. Mariposa Gazette, March 29: It is a long time since anything has been reported from the mines over here, and there is not much now that is interesting. I have had more water than I needed or wanted, overflowing ditches and causing huge landslides from the hanging-wall of the mine, and covering over the two best timbered and deepest shafts, where I made the most gold and have the best quartz. I have spent considerable time sluicing on the north side of the hill uncovering a fine vein. The worst thing to contend with is a heavy bank of pipe clay, which crosses the vein and

will carry away all the gold that will stick to it. I have now uncovered 100 feet of a splendid vein, a continuation of the "big nugget" vein, and if the water holds out, soon will have 200 feet of the hanging-wall uncovered.

Nevada.

MINING OPERATIONS TO BE COMMENCED.—Grass Valley Union, March 29: The Ben Franklin mining property, situated on the Osborne Hill range and near the lower Colfax road, which was recently bonded to a Chicago company, will have work started up at an early day, the only delay being caused by the bad condition of the roads, which proves a drawback to the hauling of the necessary machinery; but when the roads are sufficiently dried up the work of putting up steam-boasting and pumping works will be commenced and pushed. The Ben Franklin is an old location, one among the first made in the district, and at the time that locations were made in square claims. The claim originally made on the Ben Franklin was worked down to the boundary lines and the present company owns the ground below on the dips and angles. The mine has yielded fine ore and there is a large extent of virgin ground yet to be worked. The Chicago company, which is understood to be a strong one, has paid a portion of the purchase price of the property, which was one of the conditions of the bond. Besides the Ben Franklin, the Lafayette mine, in the same vicinity, is soon to be started up under the auspices of a San Francisco company. This claim is on the western slope of Osborne hill, and above and parallel to the Alaska mine. New machinery will be put up as soon as the weather conditions are considered favorable. The St. Johns or Knights of Malta mine is also to be started up with the least possible delay by a local company, although some of the stock has been taken by San Francisco parties. Steam-boasting works will be put on the new shaft, which is a short distance from the old shaft. The ledge in this mine is very strong and carries a very rich pay streak. With the above and the starting up of the Gold Hill, Menlo, Brunswick, and the regular work of the old and new mines now operating, the present year is bound to be one of unusual activity in quartz mining in this district.

Placer.

QUARTZ NEAR AUBURN.—Placer Herald, March 29: The Moore quartz mine, located about a mile and a half west of Auburn, and owned by T. M. Thorpe, J. W. White and Walter White, is one of the richest ledges that has ever been uncovered in this part of the State. When the present owners commenced work on the lead they found a shaft about 40 feet deep, which had been sunk years ago by some Frenchmen, and from which rumor said they had taken out considerable money. Why the Frenchmen abandoned it is a mystery, for when Mr. Thorpe and the White boys cleaned out the shaft they found rock in the bottom which showed liberally in free gold. They began at once to go down on the ledge, and are now at a depth of 150 feet from the surface, and in sinking the 110 feet they have taken out of the shaft alone, \$18,000. The three owners have thus far done their own work. They take it moderately, and yet realize handsome pay for their time. The rock from as much of the shaft as they sunk last summer, yielded them about \$10,000. How deep the pay chute is they have no idea, but they do know that in the very bottom of their present works the rock is fairly blocked with gold. The ledge on the surface prospects rich for 150 feet that they know of, which is an indication of the amount of money they will take out as soon as they get ready for drifting and stoping. Heretofore they have hoisted the water and rock with a bucket and whim, but to facilitate their work they have just put in place a ten-horse power engine for pumping and hoisting, and a trial of it proved very satisfactory. The ore is fabulously rich, and has been so from the surface, the only variation being its gradual improvement as they go deeper. The width of the pay chute as indicated from the surface, and its yet indefinite depth, point to the existence of a mine of inestimable value, and one which in some remote and almost inaccessible country would attract to its neighborhood thousands of miners and millions of capital. Quite a number of the quartz mines in this part of the country are getting down to a steady and reliable basis, and altogether the outlook for quartz mining in the Auburn and Ophir districts was never more encouraging than at present.

OPHIR MINES.—Argus, March 29: Mr. Hartley has 22 men employed at the Almont mine. The Huntington mill is kept running on good ore, while development work in the mine is being vigorously prosecuted. There is no extravagance visible in the equipment of this mine, and we consider that Mr. Hartley has so far shown good judgment and managed the mine very successfully. An upright hoiler and engine is used for pumping. The mill is equipped with a rock-breaker, a Huntington mill with self-feeders, and two Woodbury concentrators, all of which are run by water-power. A drift will be run several hundred feet on the ledge from the main shaft, which will no doubt open up a large amount of ore. Mr. Hartley is also working the St. Lawrence mine, owned by Chas. Reed. The upper tunnel is now in about 500 feet, and is still being driven ahead on very good ore. An upraise has been started on the ledge, about 300 feet from the tunnel; in this upraise the ledge is over two feet thick, and already there is a large amount of ore in sight. The ledge is well defined, and is evidently a true fissure vein. The ore from this mine is being crushed at the Pelster mill. A lower tunnel is being driven to tap the ledge at a greater depth, and we believe the developments will warrant the erection of a mill on the mine in the near future. The new mill at the Eclipse mine is nearly completed, and will be one of the best arranged mills in the county. We did not inspect the underground workings of the mine, but understand that the ledge is increasing in size, and the ore now on the dump and in the mill certainly looks very flattering. Our time was too short to visit all the mines about Ophir, but we understood that the Hathaway was running with a full force and paying well. Preparations are also being made to begin work on the Gold Blossom, and it seems to be the general opinion that the St. Patrick, the Crater, and several other mines will be in operation before the summer passes. One thing noticeable about the mines about Ophir is, that the Pelton wheel is used exclusively, which is proof that it is giving general satisfaction. With the renewed activity in mining and the prospect of a lively campaign, Ophir bids fair to be one of the liveliest camps

in the county, and will no doubt receive many visits from our politicians. T. M. Tharp and White Bros. have just put up a new upright hoiler and engine on the Moore mine for pumping and hoisting. Their new steam pump is in place, and they expect to begin pumping the water from the shaft in about two weeks. At present they are working on the lead about 300 feet east of the shaft, and are getting some very rich rock at this point.

San Diego.

SHACKLES BASIN PLACERS.—Cor. San Diego Sun, March 26: A close inspection of the contemplated course of the Mount Tecate flume develops the fact that the anticipated difficulties are not near so enormous as was predicted. The course has a very even grade, and I say unhesitatingly, that the enterprise can be effected without encroaching upon one foot of Mexican territory. The Mount Tecate M. Co. is a new organization on old-worked ground, which is situated in close proximity to the Cottonwood river, and was worked some 12 years ago by Mexicans, some of whom were very fortunate in getting quite a wad of gold; the process of obtaining it being dry washing. This way appeared to be an up-hill business, and the placers were abandoned until very recently, when a Mr. Hanson of Arizona gave the old camp a new stimulus. The placers are quite good, and all the gulches, ravines and canyons are possessed of more or less gold, and not so much less either. Water is the cry, but this will be supplied from the Mount Tecate flume, which will run close enough to the diggings to supply all wants. Your readers can form an opinion as to the richness of these diggings. The following I personally vouch for: Messrs. Johnson & McLean, in running a small cut, obtained, where they little supposed gold existed, nearly two ounces of as fine gold as I ever saw. This statement is the bedrock truth, as I had the gold in my hand. Some of the other gulches are even richer. Mr. Hanson's discovery constitutes one of the largest gold-bearing ledges on the coast. It can be traced for several miles. The developments are of such a meager sort that I am unable to arrive at any conclusion, but am satisfied that free gold has been seen in some of the pieces of quartz. In conclusion, I have the authority for stating that a force of men will commence sinking immediately.

NO CONTRACT LET.—Julian Sentinel, March 21: The statement made in these columns last week, concerning the letting of the contract for repairing the old shaft of the Helvetia mine, was made on the authority of Mr. Hubbell. It has since turned out that the contract was not signed at the time, and some minor details could not be arranged to suit all parties, so the contract was not let to any one.

JULIAN.—We were shown a letter this week from the manager of the Julian G. M. & M. Co. of St. Louis, which contained very encouraging news. The parties who will start the ball rolling will leave St. Louis the 1st of April, and promise to surprise the people of this district in the thorough manner in which they intend to prosecute the work.

Shasta.

OLD DIGGINGS DISTRICT.—Redding Free Press, March 29: The mill at the Reid mines was started up last week. Mr. F. P. Satterlee, of Shasta, has charge of the mill. Several more men have been put to work in the mine. Mr. Sherard says the mine is looking fine and he is getting confident in this side of the river. Mr. Rippetto, superintendent of the Walker brothers' mines, has returned from Salt Lake City and started up the mill Thursday morning. It was a welcome sound to hear the whistle once more. This makes mill number three running thus far. The usual force has also been put to work in the mine and a contract let to run a tunnel. An important chimney of ore has been developed lately in this mine and it is looking better than ever.

BEECHER.—Shasta Courier, March 29: In the Beecher mine at the Gage place two and one-half miles from town, the workmen in the long tunnel struck the ledge on which a shaft was sunk some depth last year. The ledge is three feet in width and prospects very satisfactorily, and all the indications are that Beecher is the owner of a good mine.

IGO.—H. C. Reno has disposed of his interest of the Chicago and Crystal mines lease to H. S. Hill, of Elk Grove, and T. R. Ryan, of Red Bluff, who will start up the mine as soon as the weather will permit. They have a large body of ore on the dump now ready for shipment. Robinson & Carr are doing considerable work on the Black Prince mine, running tunnels and crosscuts. The arastras on South Fork are all running on average ore. Doc. Dunham is putting good work on his Muletown ledge and says he will be a rich man yet.

NEVADA.

Washoe District.

ALTA.—Virginia Enterprise, March 22: Drifting southeast on the 1010 level from the bottom of the winze; face in low-grade quartz. Crushing 45 tons of ore daily of the average value of \$20 a ton.

CROWN POINT.—The 160 raise is up 31 feet and a north drift started from it to connect with the Kentuck for air. Are sinking below the south drift track to connect with the 350 stope. The bottom is in fair-grade ore. Shipped to the mill during the week 869 tons of ore, the average battery samples of which were \$17.85 per ton.

BELCHER.—The 200 level, south drift from west crosscut is out 90 feet, having advanced 36 feet during the week. The face is in low-grade quartz. Have started a west crosscut from the shaft station on the 300 level which is out 35 feet.

CONFIDENCE AND CHALLENGE CON.—West crosscut No. 1 from the 800 level north drift is out 46 feet, having been advanced 32 feet during the week. The face shows porphyry.

OVERMAN.—From the 1200 level have extracted and hoisted 264 tons of ore. Shipped to Vivian mill 238 tons of ore. Battery average \$19.68 per ton, of which \$9.68 is gold. On the 1200 level the north-west drift from the northeast drift has been extended 13 feet through hard quartz, giving fair assays.

CONFIDENCE-CHALLENGE.—West crosscut N. 10 from the 800 level north drift is out 46 feet, having advanced 32 feet during the week. The face is in porphyry.

CON. IMPERIAL.—West crosscut No. 1 from the north drift, 750 level, is in 266 feet, having advanced 14 feet; face in a mixture of quartz and porphyry. West crosscut No. 2 from the same drift is out 177

feet, 37 feet having been made during the week. The face is in porphyry. North lateral drift on the same level is in 70 feet, having advanced 27 feet during the week; the face shows quartz giving low assays.

JUSTICE.—The 622 level north drift advanced 7 feet during the week; total length, 758 feet. The face shows three feet in width of low-grade ore. The southwest drift on the 490 level advanced five feet; total length 540 feet. The face is in hard rock. The mine was shut down five days during the week on account of lack of water. Shipped to the mill 72 tons of ore. Average battery assay, \$21.48 per ton.

YELLOW JACKET.—Shipping about 65 tons of ore daily of the average value as per battery samples of \$22 a ton to the Brunswick mill.

SEG, BELCHER.—The southeast drift from the B-lcher crosscut is in 61 feet; the hanging-wall is exposed in the east side of the drift; the face and west side are in quartz, assaying from \$8 to \$15 per ton. The joint 850 level east crosscut is out a total distance of 272 feet and the face is in porphyry and clay.

POTOSI.—The east crosscut, 300 feet south of north line, 850 level, is out 90 feet; face in porphyry. The east crosscut 400 feet south of north line, 850 level, is out 127 feet; face in porphyry, with seams of quartz giving fair assays. The winze from the 930 level, 400 feet south of Chollar shaft, is down 18 feet; the bottom is in streaks of quartz giving good assays. The raise from the 930 level is up 69 feet; the face is in ore the car samples of which run from \$50 to \$70 a ton.

CHOLLAR.—The east crosscut, 80 feet south of north line, 750 level, is out 70 feet; face in quartz giving fair assays.

EAST BEST & BELCHER AND NORTH GOULD & CURRY.—In the west drift of the East Best & Belcher they struck ore that looks very favorable. The improvement in the ore the past week is very encouraging.

SAVAGE.—On the 500 level the upraise from the intermediate drift is advanced 40 feet. The top of the raise is in ore. Are extracting ore from the 400, 500 and 600 levels, and from the old stopes on the 750 level. Shipped to the mill during the week 455 tons of ore the average battery assays of which were \$20 per ton. Bullion on hand \$22,350.25.

HALE & NORCROSS.—On the 300 level they have retimbered the north drift and connected the same with the Savage upraise from the 400 level. In No. 1 west crosscut they have laid a track and put in air pipes preparatory to resuming work in the face of the drift. On the 1250 level they have started a winze in ore to connect with the southeast drift on the 1300 level. Owing to breaks in the water flume which supplies the Nevada mill, very little ore was milled during the week, and only about one-third of the regular force of miners was at work.

Cherry Creek District.

ON LEASE.—White Pine News, March 29: A local company has been formed in Cherry Creek to work the Eschequer mine on lease. The company is made up of resident miners and millmen, and as it is said there is considerable fair ore in the mine, it ought to be made a success.

Columbus District.

CANDELARIA.—Walker Lake Bulletin, March 23: Col. W. J. Sutherland, D. H. Jackson and Governor Kinkadee passed through to Candelaria last Saturday night. Mr. Jackson is the newly appointed superintendent of the Holmes property, and we are informed that Governor Kinkadee will act as the resident secretary. On the arrival of the train at Candelaria, hoofbeats were built and a glowing reception tendered the new-comers. Active operations are already begun at the mine, and it is believed a large force will soon be put on. The mill at Belleville is undergoing repairs, preparatory to being put to work on ore. There is a bright ray of sunshine hovering over our sister city, and Hawthorne rejoices thereat. Col. Sutherland is the general manager of the property, and it is due to his indefatigable energy that Candelaria emerges from the slough of despond into which she has lately fallen.

Silver King District.

SILVER AND LEAD.—Pioche Record, March 29: Silver King district is about 16 miles northerly from Bristol, or about 40 miles northerly from Pioche, and is reached by a good wagon-road. The formation is lime and porphyry, the principal deposits being at contacts. The leads named below run easterly and westerly—a little south of east and north of west, and may be easily traced on the surface. They pitch south at angles varying from 45 to 80 degrees. About \$30,000 has been realized from ore shipments to Ward, Bristol, Dry Valley and other points during past years, the shipments being made at great disadvantage, on account of excessive transportation charges, and (in those times) excessive charges for working. The ore is a free carbonate of lead, with oxide of iron in a lime gangue. Sixty-nine assays, being all the tests made in prospecting by two men, from April to October of last year, averaged 38 ounces silver per ton and 25 per cent lead. Of such ore about 300 tons are now on the dumps and probably as much more in sight in the mines. Of the Wheatly Bros. claims to which the above refers, the Ida has been prospected to a depth of but 75 feet, the Highbridge 75 feet, the Schiller something over 100 feet, the Caesar 100 feet, practically in mining parlance, mere surface work. Yet their record and present showing is good, to say the least. Other mines in the district which promise well are owned by Messrs. Geo. Jones of Bristol, C. J. Boskowitz of San Francisco, D. C. McCarter of Pioche and John F. Cupid of Ely, White Pine county.

Tuscarora District.

BELLE ISLE.—Times-Review, March 28: The 250-foot level crosscut extended 20 feet; crosscut from north gangway, 350-foot level, extended 14 feet.

NEVADA QUEEN.—North gangway, 600-foot level of North Belle Isle, extended 26 feet. The flow of water continues about the same.

NAVAJO.—South drift from the winze, 150-foot level, extended 4 feet. East crosscut from the end of south drift west, same level, extended 6 feet, cutting seams of chloride ore. South drift from No. 1 crosscut, 350-foot level, extended 11 feet.

GRAND PRIZE.—Face of east drift from the north crosscut, 500 level, advanced 6 feet and looking better.

NORTH BELLE ISLE.—South drift from station crosscut, 300-foot level, extended 16 feet and sus-

peeded, and a drift started north from same crosscut. **DRI. MONTE.**—1st level: North gangway has been extended 20 feet; seams of good ore show in drift. East crosscut from north drift has exposed 2 feet of good ore, some of which assays \$192.18 per ton. 3d level: East crosscut from the north drift, on the line of North Commonwealth, extended 15 feet, showing fine ore in the face, assays as high as \$2400 per ton being obtained.

NORTH COMMONWEALTH.—1st level: Have started No. 2 east crosscut from south gangway to develop ground south of No. 1 crosscut where ore is opened up. Upraise from No. 2 north drift extended up 11 feet in vein, but nothing of value. South drift from joint crosscut advanced to feet; the ore is not so high grade as heretofore. East crosscut from north drift from same point is penetrating ore, some of which is high grade; assay to-day \$492.18 per ton.

COMMONWEALTH.—1st level: East drift from north drift extended 11 feet. The ore is better grade than heretofore. East line crosscut from north gangway advanced 20 feet through vein matter. 2d level: No. 2 east crosscut extended 8 feet, cutting seams of spar, and is looking favorable for ore. 4th level: East crosscut from north gangway extended 13 feet through porphyry. South crosscut from south gangway has been run 11 feet, cutting some high-grade ore. West crosscut from same point extended 6 feet, showing low-grade ore. The extraction of ore has been suspended for the present and the mill is being cleaned up. Ship to-day \$15,000; total for the week, \$31,000. Concentrator is running right along. Crushed 476 tons, assay \$17.85 per ton.

ARIZONA.

QUEEN BEE.—Mohave Miner March 29, C. H. Park, superintendent of the Queen Bee M. Co., has made a contract with Joseph Prisk to sink the upper shaft 125 feet deeper and to run a drift along the ledge 135 feet, the contract to be completed in 120 days.

SILVER KING.—N. C. Amer is awaiting the arrival of some new steam-boasting machinery which he intends putting up on the Silver King. There is too much water to handle for the whim, and a steam hoist is imperative for the economical working of the mine.

TODD BASIN.—W. G. Campbell has obtained a hood on the Oro Plata and Mariposa mines in Todd Basin, and he will in a few weeks put up a plant to work the ore from these mines. The work of leveling the ground for the placing of the machinery will be begun next week.

BLACK HAWK.—Geo. M. Bowers, the superintendent of the Black Hawk mine, spent several days in Kingmao this week, and reports the mine in good shape, and looking as well as ever. A new creek has been made in one of the upper levels, but the extent is unknown.

C. O. D.—Manager M. D. Howell has closed down the C. O. D. mine for the present. There is too much water for the present hoisting machinery to handle. When operations are again resumed the mine will be sunk 100 feet deeper, and a good deal of prospect work done.

IVANPAH.—Mr. Lawrence of Ivanpah was in Kingmao this week with a lot of high-grade ore from that district, which he had worked at the Kingmao Sampling Works. He reports but little doing in that camp, as but few of the mines are being worked on account of the great cost of getting the ore to the railroad.

GRAND CANYON.—Journal-Miner, March 26: John Marshall, one of the discoverers of mineral to the Grand Canyon, was in Prescott on Saturday, getting assays made from the new find. He says that they discovered ten well-defined leads, from each of which they secured rich specimens of ore. The Colorado river at that point does not exceed 200 feet in width, and the ledges could be plainly seen on the opposite side of the river. Mr. Ashurst and himself made a raft and attempted to cross the river, and had a narrow escape from drowning, when they were compelled to abandon it. In addition to the discoveries of ore made, Mr. Marshall says they found a deposit of very pure salt. Several prospecting parties have already gone into the canyon from Flagstaff, and he thinks there is a good prospect for a lively camp there this summer.

QUARTZ AND PLACER.—Big Bug placer miners are said to be washing out lots of gold. The Howard mill, on the Hassayampa, is running on half time. Several mines in Yavapai county are listed on the Kansas City mining exchange. The shaft of the Black Horse continues in good ore. Messrs. Charmikie & Chambers are running the Lowell mill, on Lynx creek, with good success. Douglas Gray has deeded to E. M. Sanford nine mining claims in Turkey Creek district, for \$500. President De Kuhn of the Mockingbird Mining Co. is arranging for the construction of a new dam. Eight tons of ore arrived a few days ago at the sampling works from the Hillside mine. Geo. W. Sines and Charles H. Keyes have deeded the Beo Franklin mine, Hassayampa district, to Dan O'Boyle, for \$500. A deed has been filed for record from J. B. Tappan to D. M. Martio for the Occidental mine in Copper basin, for \$2000. President J. C. Brown and G. J. Baer of the Quartz Mountain M. Co. returned yesterday from that property. They report the mill still running. The company is also shipping a lot of high-grade ore. W. A. Long, formerly foreman of this office, has turned prospector, and has succeeded in finding some very promising ledges, as well as good placer ground. Deeds have been filed for record, transferring title to the Black Horse and White Horse, and two other mining claims from former owners to the Black Horse M. Co., the consideration named in the latter instrument being \$15,000.

COLORADO.

SILVERTON NOTES.—Miner, March 20: The strike in the Little Dora still holds out, and when better hoisting facilities are provided, the mine can easily output a carload per day. The Columbia lessees have about 50 tons of ore out, considerable stoping ground opened, and a future in sight that from this distance looks rosy. John Cotte, the lessee of the Lookout, was down from the mine this week making arrangements to open the trail and begin packing the winter's output. The Jennie Parker will open the road to the depot this week and resume shipping. There is ground enough opened now to put a force of ten men working on ore. A rich

strike of gray copper is reported in the North Star on Sultan. The mine is said to have never looked so well before, and the output for the next three months promises to be very heavy. Work is being pushed on a claim near the Burro bridge, owned by Linke, Fletcher & Milton. A crosscut has been run over 200 feet, and it is expected the vein will be cut in the next 20 feet at a depth of 100 feet from the surface. The North Star on Solomon is still drifting on the ore found in the 5th level. At one place the streak was six feet wide, all solid ore, worth from 200 to 500 ounces per ton. It has since narrowed to an average of six inches, and is liable to open out again at any time. There is 200 feet of stoping ground above the strike. Two men are pushing work on the Iowa, drifting on the ore to open up ground. Messrs. Robin & Thayer will employ 20 men on this property as soon as provisions can be taken up. There is plenty of ore in sight, and five tons daily is to be the output. The mine will be worked from both ends of the claim, and it is expected the ore from the south end will be clear profit.

THE AUSTIN.—Aspen Times, March 29: Howard Russell, the Bourquin brothers and associates have struck a new body of ore in the Austin lease, near the Climax. It is thought that they will soon be ready to ship pay ore.

THE LITTLE ANNIE.—Supt. McGee and George Besser came down from the Little Annie yesterday with average samples from a new two-foot streak of ore just struck in that mine. The average assay was 120 ounces silver and 44 per cent lead. This new strike, together with other bodies heretofore opened, places the Annie in the list of pay mines. The week's shipments from the Bushwhacker will amount to two carloads of ore, averaging over 100 ounces per ton. The 30-horse power hoister will be in running order on this mine by the 2d, when the force will be increased by adding about 10 miners. A joint survey is being made between the Park-Regent and Bushwhacker to determine the underground dividing line. The Iowa is looking well, a large body of spar has been struck which assays low, but it is thought will soon lead to pay ore. The property is being worked by the Iowa and Smuggler Mountain Mining Co.

DAKOTA.

SYNDICATE SMELTER.—Deadwood Pioneer, March 25: The little plant will probably not be blown in for another month. While in Chicago, Dr. Carpenter purchased for it some \$2000 worth of machinery, including another boiler. This will not be shipped for two weeks, and as it must then be erected, it is believed fully a month will elapse before the next run begins. The run will be made on Bald Mountain and Ruby Basins, as well as on ore from the Oro Fioo. Once started, the purpose is to keep the plant continuously in blast, the object in securing another boiler being to get sufficient power to keep the rock-crusher and furnaces in operation at the same time. The process, the Pioneer can repeat, and at length with the sanction of official authority, is a complete metallurgical and financial success.

IDAHO.

GOLD QUARTZ.—Idaho Statesman, March 29: D. W. Fitzwater, who arrived from Rocky Bar yesterday, tells of a big discovery made at Pine Grove of gold quartz. He says that it is the last, best and richest mine yet discovered in that camp. There are hundreds of tons of ore in sight, and this mine, with those formerly discovered, will keep the two quartz-mills located at that place with all the crushing they can do, and cause the town to boom during the coming summer. The mine or prospect is owned by several parties, among whom are D. B. Ethel and John Van Schaack.

CROSSCUT.—Idaho Avalanche, March 29: Supt. E. H. Dewey informs us that the crosscut being run by the Idaho & Pittsburgh Mining Co. to cut the Empire State and Black Jack lodes is being run five feet every 24 hours, which, considering that the crosscut is seven by five feet in the clear, is excellent work. He says he proposes to push the crosscut as fast as possible, to the end that the veins may be cut and a bonanza found.

SOMMERCAMP.—We understand that the Sommercamp group of mines is growing richer daily, and that a large quantity of shipping ore is in sight, which is being extracted and sacked. The gold-bearing lode is producing ore that will mill from \$30 to \$50 per ton, which, considering the size of the lode, is a bonanza to itself. From deep development work, it has been proven that the mines of Wagontown are not only rich, but large, and that the mines should be worked by deep shaft, through crosscuts, or tunnels, which strike the lodes at great depth.

LOWER CALIFORNIA.

REAL DEL CASTILLO.—Lower Californian, Mar. 21: The good news of discoveries at Alamo last week is well supplemented by the reports from the Real del Castillo. Mr. L. B. Howard of the Occidental M. & M. Co. returned Wednesday in a very happy mood, which was explained by the fact that his 550-foot tunnel into the Occidental had reached the vein, disclosing a 23-inch body of free-milling ore at a depth of 230 feet below the surface of the old works. The drills are now in solid rock, beyond which is the main vein, about four feet wide. This tunnel opens up an immense amount of ore, which can be easily shipped. It will be worked near by, in a ten-stamp mill soon to be built by the Occidental Co. A turbine wheel, operated by the San Rafael river, will furnish the power. The unsorted ore as run through the old Pueblo mill gave an average of \$20 per ton, and the quartz at 230 feet is of exactly the same quality as that in the old shaft. It is not a chimney ledge, but a true fissure vein, with well-defined walls. By the use of water-power the ore can be treated for considerably less than \$5 per ton. Mr. Howard is also connected with the Tepueste iron mines at San Isidro, and stated that a blast furnace would be built at San Diego for the treatment of ores as soon as a site could be decided upon. The Princess G. M. Co., recently formed in London with \$125,000 capital, to acquire and work part of a gold-mining property now in possession of the Mexican Land and Colonization Co. in the Alamo district, has already been noted. The mines included in the late purchase are the Ulysses, Cocinera,

San David, Priocesa, Spider, Grandissima, Moran and Iron Mask. A small quartz-crushing mill on the property in 40 days' operation crushed 375 tons of ore from five of these mines, the yield being 763.54 ounces of gold, valued at \$12,598. The mill has not yet crushed any ore from the Spider mine, but it is officially reported that the surface ore from this mine shows over \$100 per ton.

THE WORK AT ALAMO.—The hoisting works on the Indian mine are now nicely in operation. They are the most complete yet erected in the camp. Major Zimbleman has bought or leased the Elsinore and is building a chute at that mine. The Major is wide awake and he will soon be running again. The blanket ledge of conglomerate rock on the road between here and Mexico Gulch continues the subject of much interest. This is thought by many to be the richest thing yet found in the district. It consists of a very ordinary blanket porphyry ledge three feet below the surface, and it is said to be a meter thick and rich beyond calculation.

MONTANA.

IN THE VIPOND DISTRICT.—Inter-Mountain, March 26: Major B. J. Fine has a bond on the Wasego mine, in the Vipond district, which adjoins the Lone Pine property, on which a 20-stamp mill has recently been erected by Helena parties. There are five men at work; and two carloads of excellent ore were shipped to Butte yesterday which were sold by Major Fine to the Silver Bow Sampling Works. The shaft on the Wasego is now down to a depth of 80 feet, and the lead is from four to eight feet in width. There is every indication that it will develop into a valuable property. Shipments of ore to Butte will continue regularly.

ARGENTA DISTRICT.—Anaconda Review, March 27: In the Argenta district a very confident feeling prevails among those best posted on the resources of the camp, that the coming season will place them in a prosperous condition, and that their production and shipment of lead-silver bullion, with enough gold in it to make it a matter of interest, will be of sufficient magnitude to attract capital to properly develop and show up their properties. The P. J. Kelly Co. has been merged into the Argenta M. Co., and the new capital enlisted in this company has already paid off the indebtedness incurred by the old organization. The Tuscarora and Scott properties are not doing anything at present, but a rumor is afloat that W. A. Clark has authorized the starting up of these at an early date.

HOPE.—Phillipsburg Mail, March 27: From present indications around the Hope mine, we feel safe in saying that it will not be long until we will be producing as much ore as ever. There are several men at work in the mine at present. Work is being pushed on the Jubilee tunnel, below the hoist.

NEW MEXICO.

MOGOLLONS.—Silver City Enterprise, March 20: In the upper Dry creek region several parties are actively engaged in prospecting and opening up a number of valuable finds, which were located last year. Of the Lily, owned by Luke, Hussey and McCarthy, it is not saying too much to pronounce it as one of the most promising prospects in the Mogollon country. The developments consist principally of stripping the vein and open cuts, which as now exposed present to view one of the finest showings in the Southwest. A tunnel on the vein has been started, which will gain foot for foot from the horizontal as it penetrates the mountain. An average of a dozen assays made from careful sampling of the pay streak in a vein eight feet wide, has a value of \$600 per ton. The owners are now engaged in active preparations to open the mine thoroughly and develop it for all it is worth. Two miles and a half distant from the Lily, Baxter and Tennessee they have several valuable locations, from which they are taking a fine grade of ore.

OREGON.

GOLD-DUST.—Jacksonville Times, March 29: Considerable gold-dust has already been taken out here and there, and the amount will increase as the season progresses. Repairs have been completed at the Sterling M. Co.'s mines, and pining has begun a few days ago. A big run will no doubt be made there. There is still plenty of water and miners are making the most of it. A vast amount of gold-dust will no doubt be taken from the placers this season. Breeden & Schrimpf struck a pocket in their ledge on Applegate last week, from which they took over \$280. This is the same mine which John Swinden is now interested in. J. O. McGee of Williams creek, who was in Jacksonville yesterday, informed us that J. T. Layton had nearly completed repairing his ditches, and would probably commence pining in a short time. John Swinden has bought a half interest in the Adelphi mine on Applegate, formerly owned by Breeden & Schrimpf, and will continue to work the same in partnership with Mr. B. The consideration was \$1000. E. Sandersoo Smith is looking after Griffith & Co.'s quartz mine in the Steamboat district, and will prospect the same thoroughly in the interests of outside capitalists.

UTAH.

REVIEW.—Salt Lake Tribune, March 28: The week has been devoid of special feature. Stormy weather continues, and is anticipation of the spring break-up and its usual bad roads, the big ore-producers are laying in ore reserves and supplies at the mills and shipping points to last over the expected blockade. The receipts of the metals in this city for the week ending the 26th, inclusive, were to the value of \$111,409.03 in the aggregate, of which \$73,758.97 was in bullion and \$37,650.06 was in ore. For the week previous the receipts were to the value of \$61,660.68 in bullion and \$51,445.94 in ore, a total of \$113,106.62. The product of the Ontario for the week was in bullion 18,859.18 fine ounces. The Daly output for the week showed no transactions. The Horn Silver develops nothing new locally this week, its product and quality of ore being about as hitherto reported. The bullion receipts of the week foot up \$42,086.80; fine bars, \$3963. The Hanauer smelter produced during the week bullion valued at \$7950. Ore receipts to this city for the week were valued at \$232.16 by Wells, Fargo & Co.; \$24,700 by McCormick & Co.; \$10,637.90 by T. R. Jones & Co.

MECHANICAL PROGRESS.

American Tin Plates.

We have already noted the fact that tin plate had been produced on a small scale in Pittsburgh. Another and larger company has recently been formed in Chicago, to be known as the "Glendale Tin-Plate Company," which will procure their tin from the mines in Dakota. One of the officers of the company recently visited Pittsburgh, where he had gone to confer with the officers of the American Tinned Plate Association relative to the necessity of proper Congressional action for the protection of home tin-plate production. He said: "Tinned plate will be one of the chief industries of this country. All iron manufacturers ought to give their attention to this industry. It will, in the future, give the greatest opportunity for large profits. Just before I left Chicago I made a contract to furnish ten tons of tinned plate to a Chicago firm. That is the first order taken by an American firm. The prospects for the business are very bright. I think in four or five years enough American tin plate will be manufactured to supply the home market."

A box of tin plate manufactured in this country costs fully one-third more than in England—on account of the difference in the cost of labor between there and here. In the tin-plate mills of Wales whole families work at the business from the oldest to the youngest, both male and female, and at starvation prices. The present duty is not a protective one. It will barely admit the possibility of the manufacture without profit. But it is hoped that ere long, owing to the superior yield of the Dakota mines, the raw material may be furnished cheaper here than it can be produced abroad, and so admit of a small profit. Hope is also expressed that the duty proposed by the Senate bill will become a law, which, while it is not as high as it ought to be, still has the merit of being, to a certain extent, protective. If the tin-plate industry could be built up in this country, it would save for our people from thirty to forty millions of dollars a year which now goes to support the cheap labor of England. It would give employment, directly and indirectly, at the mine and the shop to fully 1,000,000 people—men, women and their dependents.

We have in this country the tin and the iron ore, the capital, the intelligence and all other facilities except protection against the cheap "family industry" of England. It is the duty of Congress to see that our capital and industry is protected against such odds.

NEW GERMAN INVENTIONS.—Kuhlow's *German Trade Review* notes the invention of pulleys made of hydraulic-pressed pasteboard and having an iron core and strong casing. It is said that the friction of such pulleys is considerably greater than that of cast-iron pulleys, and with an equal useful effect they therefore take up less space. As the tension of belting on paper pulleys need not be so great as on iron pulleys, the vibration is less, and to that extent the buildings, etc., are saved. The manufacturers affirm that these pulleys are proof against water. They are made of the well-known oil paper of which paper railway wheels are made. Some other interesting achievements with paper, says the same journal, have been accomplished by a paper goods manufacturer at Dresden, who by means of compressed, chemically prepared paper has succeeded in producing bandlees and shafts which are characterized by great endurance. A file-handle submitted as a sample presents a woodlike appearance, a brown shining surface, and is very hard. It is light, and has probably the advantage of being a bad conductor of heat. It sometimes happens that in the use of wooden handle splinters get forced into one's hand, but with the use of paper handle that danger is entirely obviated. The invention would appear to be an important one.

MECHANICAL DRAWING.—In discussing the importance of a knowledge of drawing to the mechanic engaged in any of the building trades, one of our English exchange observes: The interpretation of drawings by artificers connected with building will be necessarily imperfect till the art is made one of the acquirements of the workman. In England the subject has never been brought down to the level of the workman's knowledge, and only of late years has there been any attempt to teach drawing to workmen in a systematic manner. The technical schools in France and Germany have long made drawing an essential mode of training the eye and hand. Every trade has to pass through the stages of drawing. Copying from paper examples is forbidden in some schools, and the system is to get the pupil to draw from models, so as to teach him to apprehend the meaning of lines in perspective, as well as to make him understand geometrical delineations. In our opinion, drawing can only be properly taught by the aid of models, and a course of well-directed model drawing will do more to instruct the eye and mind than all the flat copies and diagrams of the text-book.

SPIRALLY WELDED TUBES.—To which we have made several allusions, are made by automatic machinery out of steel strip, which is of very mild quality and welds perfectly. It is rolled in strips of from 12 to 18 inches wide and as long as possible. For long tubes, several are

welded together. The steel is fed by rollers into the pipe-forming machine, where it is wound into a spiral, raised to a welding heat by blowpipes of water gas, the joint being finished by a light and rapidly-working hammer. The longest tube yet made was 57 feet long and 10 inches in diameter.

ARTISTIC PROGRESS IN FLINT GLASS.—The progress that the flint-glass trade is making in an artistic direction is truly wonderful. A walk along the streets of any of our large cities will reveal some very beautiful designs, the result of processes heretofore unknown to the glass trade. The discovery of an improved method of staining ware is very important. Pressed ware is now colored to either represent ruby, amber, blue, or in fact any of the colors now turned out in glass. It is so clear and brilliant that it takes a practical eye to discover the difference between it and the real article. There is nothing to indicate that the ware is not of the real color, outside of the fact that it is usually placed on pressed ware, and everybody connected with the trade knows that real ruby is seldom used in pressed ware. An outsider could never discover the difference. It can be placed on the pressed imitation of cut ware in such a way that no one would think the glass was plated with the color and then partially cut away. The use of this idea on railroad signal lanterns might be much of an improvement over those in use that are merely painted red.—*Commoner and Glass Worker.*

GERMAN SEWING MACHINES.—Germans are making 50,000 sewing machines per annum and claim that they are competing successfully with manufacturers in the United States. Many machines go to South America. Our Consul at Mannheim says: An enterprising firm whose founder is a citizen of the United States designs making regular shipments to this country, with names and ornamental engravings suited to the German population. This firm is the second largest in the Empire; it produces about 30,000 machines in a year and employs about 700 hands. They manufacture the Singer machine. With this they are heating our manufacturers, so they claim, in every country outside of the United States, because they produce and sell a much cheaper, if inferior, article, because ours is better only in finish and decoration, and therefore answer the people's wants just as well. This manufacturer confessed that his iron castings are by no means as good as ours, and that we have lots of better machines than those of German make.

FINE MECHANISM.—Some wonderful examples of human ingenuity and skill, which illustrate in a remarkable way the progress made in mechanics, have been put on exhibition by the London Mechanical and Scientific Society. An instrument loaned by the great Armstrong Gun Works accurately measures thickness down to the one-thousandth part of an inch, while a rival mechanism exhibits an instrument built on similar principles, which grades thicknesses in millionth parts. The deft-fingered Ostling, whose wonderful balances have a world-wide reputation, shows a delicate scale which will carry 3000 grains and yet turn distinctly with the one-thousandth part of a single grain. A watchmaker of Paddington now comes in for his share of praise and exhibits an engine built of 122 pieces, not including 33 bolts and screws, nicely hidden in a lady's No. 7 thimble. If inventors of great things deserve great praise, what shall we say for the skilled fingers and clear brains which fashioned the above?

REDUCING FRICTION IN ELECTRICAL MACHINERY.—Numerous experiments have been made recently in reducing the friction in the bearings of dynamos and electric trolley-wheels. The Thomson-Houston Electric Company is now investigating a system, by the use of which it is said the reduction in friction would net a saving of over 10 horse power out of every 1000-horse power. At present the new system is being applied experimentally to the trolley-wheel. With the present system the bearings wear out rapidly and have to be replaced about once a month. In an experiment with the roller bearing, the rim of the wheel wore off while the bearing remained in good condition.

THE LARGEST STEEL FLUME IN THE COUNTRY.—And probably in the world, is now being constructed for the Spokane Hydraulic Mining Company. The flume will be an immense steel pipe 4½ miles long, carrying water from the old California ditch, at the head of Pritchard Creek, in the Coeur d'Alene mining district, above Murray, to the Old Wash gold diggings. The flume will be made of heavy steel pipe, 22 inches in diameter.

IMPROVED PLANT.—A large saving in the cost of heavy guns has been effected in the Washington foundry by the use of the improved plant. Eight-inch guns now cost only \$14,623, or \$3000 less than was recently paid for guns half that size. Sufficient attention to economy in that direction is not as general in our large shops as it should be.

A STOVE OVEN THERMOMETER.—An improved oven thermometer, a device to be applied to the oven doors of cooking stoves, ranges, etc., to indicate the exact heat for baking purposes, has lately been patented by a firm in Ohio.

SCIENTIFIC PROGRESS.

The Influence of the Earth's Rotation on Moving Bodies.

A late German writer, T. von Barier, says: It has often been observed that in railway lines running north and south there occurs, in course of time, an appreciable displacement of the rails, always more noticeable on the right-hand side going south. This is, as the author remarks, chiefly due to the effect of the rotation of the earth on its axis, the normal condition being that with a train traveling in such a direction and equally loaded, there is a greater pressure on the right-hand side than on the left.

In north latitude 51°, a man weighing 165 pounds, running at the rate of 13 feet per second from north to south, sustains a horizontal pressure toward the east equal to 54 grains, which, acting at the center of gravity of the body at, say three feet three inches above the ground, necessitates an extra pressure on the right foot of 0.63 ounces, in order to maintain the vertical position of the body. In going from south to north the proportion is the same; in the southern hemisphere the extra pressure would come on the left side. With varying directions the force is, of course, proportionately varied.

In the case of an express train, weighing, say, 400 tons, traveling northward at the rate of 50 miles an hour, the extra pressure on the right hand or eastern rail amounts to 501 pounds, the same pressure coming on the right-hand or western rail when traveling in the reverse direction. In more northerly parts the lateral force increases, reaching its maximum at the north pole, in which region, in a case similar to the preceding, the extra pressure on the right-hand side would be 660 pounds. In the large ocean steamers the force is considerably greater, the side pressure on the Inman liner, City of New York, being about 936 pounds. The tendency of this lateral pressure would be to drive the vessel (if on a northward or southward course) somewhat to the east, so that to keep on a prescribed course requires a slightly increased engine-power to overcome the tendency to deviation. This increase is, however, not more than 110,000. Such as it is, it is appreciable on the east and west run between Liverpool and New York, but would be distinctly perceptible in a voyage to Buenos Ayres.

The Ice Period of North America.

Ever since the commencement of the present century, the Glacial Period or Ice Age of the North American Continent has occupied much of the attention of geologists and other scientists. General attention was first called to the matter by the investigations and publications of the elder Prof. Hitchcock. There appear to be three distinct eras of progression in the discussion of the question, as follows:

First. From 1800 to about 1850, when the belief was quite general that the entire northern portion of the continent was submerged and covered with floating icebergs, moving in a southerly direction, hazing their course by deep groves in the rocks, scooping out little valleys, etc.

Second. From 1850 to 1875, during which period the submergence and iceberg theory gradually gave way to glacial action—immense rivers of ice which flowed or plowed their way southerly over the continent, leaving the same marks of progress which had previously been attributed to icebergs.

Third, and lastly, since 1875 the idea has been gradually gaining ground that previous theories have been quite too superficial to account for all the phenomena observed almost everywhere on the central and northern face of the continent, and that our theories in this connection must be remodeled.

Prof. C. H. Hitchcock of Dartmouth College, N. H., has recently written a review of "Wright's Ice Age of North America," which is replete with information on this subject. Mr. Wright, in connection with the late Prof. H. C. Lewis, made a special work of the study of the phenomena connected with the Ice Age of the continent, and especially of the great terminal moraine which they traced through New Jersey, Pennsylvania, Ohio, Kentucky and Indiana. They also spent a summer on the great Muir Glacier of Alaska. In their record of this examination they say that "this glacier is located at the head of Glacier bay, in latitude 50° 50' and longitude 136° 60', with mountains over 15,000 feet high between itself and the Pacific ocean. The glacier is formed from nine branches and 17 branchlets, which discharge into the inlet from a point of 300 feet." The movement of the ice was 40 feet per day on the eldes and 70 feet in the center. The water-front of the glacier is about one mile across, from which bergs are almost continually falling off. The entire period of the continuance of the Ice Age is estimated by Prof. Prentiss to have been from 15,000 to 25,000 years. The study of this problem and the phenomena connected with it is one of the most interesting which has ever engaged the attention of the geologist.

A CARBONIC OXIDE INDICATOR.—An apparatus for indicating the presence of carbonic oxide gas in the atmosphere has been perfected by M. Rasine. Its action depends on the prop-

erty of spoozy platinum to absorb carbonic oxide with evolution of sensible heat. Two metallic plates are placed vertically over each other, which, when touching, close an electric circuit. The upper plate is suspended from a hook by means of an easily combustible thread. This thread is wrapped in muslin, containing a little cotton powder dusted over with spoozy platinum. If this arrangement is exposed in an atmosphere containing carbonic oxide, the spoozy platinum will absorb it and set fire to the cotton, which will in turn burn the thread, and so cause the electrical contacts to complete the circuit and ring a bell.

THE HUMAN BODY IMPROVED.—We have all heard a great deal from time to time regarding the perfect adaptability of the human body to the various uses for which it is intended, and we have been taught to believe that, considered simply as a machine for accomplishing certain things, it was well-nigh ideal perfection, and left no room for improvement. It seems, however, that a Russian inventor thinks differently, and has taken out patents, both at home and in this country, for what might be called "Improvements to the Human Body, Designed to Facilitate Walking, Running and Jumping." The drawings show two large springs in the shape of a bow, their upper extremities attached to the shoulders or at either side of the waist, and the lower extremities to the feet. The necessary hands and buckles and harness for securing the springs are variously disposed about the body.

CINCHONA TREES IN SAN FRANCISCO.—Adolph Sutro is trying the experiment of raising cinchona trees near San Francisco. "If he succeeds," says an exchange, "he will not only have some very ornamental trees, but demonstrate that the raw material for quinine can be produced in this country." By late accounts it appears that the Cedron bean is likely to eventually supplant quinine. The extract from this bean or seed is said to possess all the virtues of the cinchona or Peruvian bark, while it produces no unfavorable effect upon the head. Its action is mild—not unpleasant as quinine is, but very effective in malaria, chills and fever, colds, etc.

DESTROYING AND RENEWING THE EXPLOSIVE POWER OF NITRO-GLYCERINE.—Another man claims to have made a discovery which will "revolutionize the art of war." His name is Schwahn and he lives in New York. His invention is a neutralizer of nitro-glycerine. He mixes the two and the compound will burn with a blue flame but not explode; but by pouring water over the compound the two elements separate and the deadly properties of the nitro-glycerine are restored.

A DISCOVERY.—It is said that a man in Woodhull, N. Y., has secured a patent on making hemlock trees yield bark perpetually. Ordinarily, stripping the bark from a tree kills it; but this Woodhull inventor applies a solution to the tree, after peeling, that excludes the air, and the result is a new crop of bark the next year. If he has obtained a patent for his alleged invention, he must have satisfied the Patent Office that he really can do what he claims.

DETERMINATION OF SILICON IN IRON.—To determine the quantity of silicon in iron, Clerc heats one grain of the powdered specimen with 15 to 20 cc. of water, 10 cc. bromine, and 75 cc. of hydrochloric acid, to 100°. After the solution is completed he thins it with from 200 to 300 cc. of hot water, filters, washes the remainder, calcines and weighs the silicon. The experiment occupies little time and is exact.

INSECT LIFE.—It is said that there are over 1,000,000 species of insects upon the earth. There is no region free from insect life. What any animal can do, some insect can do; what any animal can eat, some insect can eat; there is no mode of progression used by any animal that some insect does not use. Their antipathy of classification is most perfect.

A NEW RANGE FINDER is spoken of in Berlin which is said to be superior to anything of the kind in existence. Up to 7000 yards it indicates distances with a degree of accuracy hitherto unapproached. The instrument, the readings of which are determined by geometrical methods, is the invention of Capt. Erle, a staff officer of the German artillery.

THE ALEXANDRINE BLUE has again been discovered, according to a French mineralogist who claims to have discovered in a mixture of copper and lime the beautiful color azurine, the composition of which has long been a puzzle to artists. His tint is said to be perfectly unchangeable, and is identical with the famous Alexandrine blue.

NOT INJURIOUS.—It appears to be dawned upon Congress, as well as upon the country generally, says the *New York Shipping List*, that the mixing of pure cotton-seed oil with lard, although it may be an adulterant, is not unhealthful, etc., but an absolute improvement in every way.

SCIENCE TEACHING IN CHINA.—It is a curious fact to notice that in China scientific subjects are being taught by Japanese instructors who have acquired their technical education in this country, and that the teachers are using the English language with their classes.

GOOD HEALTH.

TOOTHACHE.—The president of the Midland Branch of the British Dental Association, Mr. H. C. Quilby, protests against the present extravagant waste of human teeth by country surgeons and incompetent dentists, and declares that, while there may be sufficient reasons for extracting a tooth, it is never necessary to do so merely to relieve pain. In at least 90 per cent of the cases coming to an active dentist, pains from teeth are due to what may be called primary and secondary toothache. Primary toothache, the pain of which is often felt in the nerve terminals in the face than in the tooth itself, is congestion of the tooth pulp, and it may be relieved very easily by careful excavation sufficient to allow an escape of blood from the pulp, which may then be devitalized by an arsenical dressing. To complete the operation, which may be postponed for weeks without further inconvenience, the pulp must be removed from the root canal, and these filled to the apex. Secondary toothache, or alveolar abscess, is caused by gangrene of the pulp, and is regarded by most surgeons as so serious as to call for a removal of the tooth, which in nine cases out of ten might be retained and made useful and comfortable. The course of treatment is an opening to the pulp to relieve the pain, followed by a series of antiseptic dressings in the roots to cleanse them from all putrescent matter, and then, as in the other case, filling them to the apex.

OPERATIONS ON THE LIVER.—The fatal result attendant upon an operation on the liver of a lady in Grass Valley furnishes no good reason why, under favorable conditions, such operations may not be successful. In the course of long investigation, Prof. Poncio de Breslan has made the important discovery that a large part of the liver—even as much as three-fourths—may be removed without serious disturbance of the animal functions. Surgeons had before known that the whole of the liver is not absolutely essential to health, but could hardly suppose that the sudden destruction of a considerable part of it would not be serious, and now may be enabled to perform operations hitherto believed to be impossible. Prof. Poncio found that the liver has a wonderful power of reproduction, in some cases a portion equal to two-thirds being replaced by a new growth within a few weeks.

LOOKING BACKWARD ON LA GRIFFE.—There were altogether about 300 distinct epidemics of influenza or la gripe in Europe between 1510, when the disease was first noted at Malta, and 1850. In 1729 the whole of Europe suffered severely. According to statistics published by the *Nove Vermya*, the disease caused 908 deaths in London in one week, and in Vienna 60,000 persons were affected. In 1737 and 1743 there were further outbreaks, and the deaths in one week in London amounted to 1000. In 1775, domestic animals were first attacked by it. In 1785, 50,000 persons fell ill of it in St. Petersburg in 24 hours. In St. Petersburg, quinine is now served out daily to the troops.

DIPHTHERIA.—The *Scientific American* recommends the following: At the first indication of diphtheria in the throat of a child, make the room close, then take a tin cup and pour into it a quantity of tar and turpentine, equal parts; then hold the cup over a fire, so as to fill the room with fumes. The little patient, on inhaling the fumes, will cough up and spit out all the membranous matter, and the diphtheria will pass out. The fumes of the tar and turpentine loosen the matter in the throat and thus afford the relief that has baffled the skill of physicians.

DEADLY WORK OF NICOTINE.—In France, experiments were made to show the effect of tobacco smoke on meat and other food, including vegetables. A piece of rare meat, after being exposed for some time to tobacco smoke, was offered to a dog, which refused to touch it. It was then concealed in some palatable covering, and the dog ate it and died in a short time. An autopsy showed nicotine poisoning to have caused death.

A CHOLERA SPECIFIC.—A report comes from India that a specific has at last been found for the terrible scourge of cholera, and that out of 18 patients treated with the drug, the name of which is *salol*, not one succumbed to the disease, although some of them were in a state of collapse when the drug was administered.

PROFESSIONAL ATHLETES.—"Show me a professional athlete 40 years old," says an eminent physician, "and I will show you an old man beyond his time, with bones out of shape, muscles injured, and joints stiffened, and no one would promise him five years more of life."

A NEW USE FOR ELECTRICITY.—It is claimed that wall paper can be made in such a way that the passage of low-tension electric currents will heat it moderately warm to the touch and diffuse throughout the room an agreeable temperature.

EIGHT VARIETIES OF LEPROSY are recognized in China, and the disease is recognized as contagious, infectious and hereditary, but is said to disappear in four generations.

ELECTRICITY.

Storage Batteries.

A few months ago, comparatively speaking, the electrical scientists were interested only in the action of the secondary or storage battery. Some prophecies were made as to what it might be in the practical world, but these prophecies were merely looked upon as the enthusiastic expression of dreamers. To-day the country is full of storage batteries of many makes, and the Patent Office reports new inventions and improvements every week. To-day a storage battery is useful in many ways, is almost a necessity in some cases, and, as a prominent electrician of the country said the other day, "the storage battery, even as frail and uncertain as it is now, is a necessary evil." As the storage battery—or, by another name, the accumulator—stands to-day, its usefulness for work depends upon partially known laws of chemistry and common-sense laws of mechanism. The chemical laws taken advantage of by the maker of any accumulator are invariably the same.

Electricity, like water, depends for its power of doing work on two conditions: quantity and force; its potentiality increases according to the place where it is produced as compared with that at some other place. The difference of potential corresponds with the difference of level in liquids, with the difference of pressure in gases, with the difference of temperature in heat. As the sea level is the standard for measuring the height of a mountain, so are electric levels measured from the arbitrary level of the potential of the earth.

A storage battery does not store electricity any more than the spring of a clock can be said to store time or sound; it stores energy. The energy of an electric current is used to produce a decomposition of metal of such a nature as will independently produce a current on the removal of the original current. The cells or accumulators are two plates of metals immersed in a liquid acid which is called the electrolyte, and which cannot act on the plates until after an electric current has passed through it, which effects its decomposition in depositing its positive and negative constituents on the plates. On the cessation of the current the cells are discharged by a connection outside the liquid, in the opposite direction. Plates of compressed litharge have been recently used, and many experiments are being made in the hopes of obtaining such results as will avoid the necessity of using a dynamo. Electric meters are those in which a portion of the current passes through a solution of a metallic salt, and the strength is determined by the amount of electrolytic decomposition it effects. There is also an electro-thermal meter to measure the heat caused by a certain resistance, or by the amount of a liquid evaporated by the heat generated by the current; and an electro-magnetic meter, in which the current is measured by the magnetic effects it produces upon a needle by deflecting it.

Electricity and Mechanism.

The most notable thing about the late Convention of the National Electric Light Association at Kansas City was that there was so little said and discussed about electricity, and so much about engineering and construction. The situation seemed to have been very well summed up by one of the speakers when he said: "The mechanical part of electrical construction is practically all of it." It does not follow from this that we know all about electricity and that we are done with the study of that part of it, but it is beginning to be an accepted fact that the question of the commercial success of the electric-lighting business hinges upon such plain engineering matters as the construction of boilers and engines, and upon the generation and transmission of power.

Apart from the discussion of purely business matters, the principal papers of the meeting were those upon the subjects of the steam engine, the steam boiler and the construction of a suitable building in which to put them.

Electrical engineering is rapidly working over into the domain of mechanical engineering, and electricity is taking a place among the available forces of nature as much as the forces of gravitation or the vibration of heat. This does not necessarily mean that the mechanical engineer must become an electrician, for the study of electrical phenomena should remain in the field of the physicist just as the investigation of heat, light and sound have done.

Still, whenever any of the natural forces are to be set to work, and the question of dollars and cents enters into the problem, then the mechanical engineer steps in, and it is in his hands that the most effective practical work will be done.

ELECTRICAL TRANSMISSION.—The current to be used in lighting the streets of Portland, Or., will be generated 12 miles away. This is thought to be the longest distance over which the transmission of electrical power has been attempted in this country. The current is to have an electro-motive force of 4000 volts.

STORAGE BATTERIES FOR STREET CARS.—There is no doubt about the mechanical success of electric motor cars run by storage batteries, and that seems to have been all that was demonstrated in the trial on the Lehigh avenue road

last Wednesday. Repeated experiments have shown this to be the ideal system for the running of street cars, provided the cost be not too great. On this subject we have the estimate of President Wharton that the cost will be less than that of running the cars by horse-power.—*Philadelphia Ledger*.

USEFUL INFORMATION.

THE NICKEL IN THE METRIC SYSTEM.—Somebody of an ingenious turn of mind gives us the metric system, "not in a nutshell," but in a nickel. It is claimed that our nickel five-cent piece holds the key to the linear measures and weights. The diameter of this coin is two centimeters, and its weight is five grammes. Five of them placed in a row will, of course, give the length of the decimeter, and two of them will weigh a decogramme. As the kiloliter is a cubic meter, the key to the measures of length, it is also the key to the measures of capacity. Any person, therefore, who is fortunate enough to own a five-cent nickel, may carry in his pocket the entire metric system of weights and measures.—*Cleveland Plaindealer*.

THE DYNAMITE GUN INDUSTRY promises to assume quite an important position among the industries of the country. The British Government has an order already placed with the Pneumatic Dynamite Company at the East for 50 guns which will involve a cost not much under \$1,500,000. The Italian Government, it is said, is considering the question of ordering a dozen or more dynamite guns, and will also fit out a cruiser mounted with these pieces after the manner employed in the Vesuvius. At present the Pneumatic Dynamite Company is engaged in supplying the United States Government with five 15-inch guns, in addition to the two already constructed.

EUROPE'S FUTURE INDUSTRIAL CENTER.—Whatever may be said to the contrary, it will be many years before the coal supply of England for practical industrial uses will become exhausted. It is more than probable that even within the lifetime of some now living her industrial supremacy will depart with the exhaustion of her coal-fields. Then Switzerland, Italy and the Scandinavian peninsula, or some other more abundant coal regions yet to be discovered, will become the great manufacturing centers of Europe. But ere that time the great industrial center of the world will be the United States of America.

NATURAL GAS INVESTMENTS.—The capital invested in the supply of natural gas is enormous. At the date of the official report in 1888, one Pittsburgh company had a capital of \$12,000,000, and the total capitalization of all the companies in the various States was estimated at \$90,000,000. The hundreds of companies that have organized, prospected, bored, struck water and disbanded since then, will swell that amount to almost incredible proportions.

A SEA-SHORE WITHIN DOORS.—The children of a Philadelphia household can play on the beach all the year round, to all intents and purposes. The indulgent and somewhat ingenious papa had a half-dozen barrels of Cape May sand shipped from the shore, and now it does service on the play-room floor, where the babies romp with bucket and shovel just as they did last midsummer. He opened a new barrel on Christmas Day.

CHEAP MONEY EAST.—A few days since a little village in Massachusetts sold \$50,000 worth of 3½ per cent bonds at a premium of nearly \$2000, and yet the holders were no sadder than those being issued by our irrigation districts. It would pay some of the irrigation districts to send an agent to Eastern money centers and place the bonds there. This city is paying as high as seven per cent for some of its indebtedness.

PYROTECHNIC EFFECTS in table decoration are rampant. Electric wires are run through the stems of tulips, white lilies and jonquills; a bunch of them planted in an epergne give the red, yellow, green and brown tints the glow of enchantment, and when the white bright light streams from a plaque of nuts, the sensation is rather more weird than poetic.

INK STAINS ON SILVER.—The tops and other portions of silver inkstands frequently become deeply discolored with ink, which is difficult to remove by ordinary means. It may, however, be completely eradicated by making a little chloride of lime into a paste with water, and rubbing it upon the stain.

VARNISHING NEW COPPER WORK.—In varnishing new copper work, use boiled linseed oil; it stands the weather as well as the best coach varnish, although it does not make so smooth a surface, and is much cheaper. Two coats are sufficient; let the first coat dry thoroughly before the second is applied.

GERMAN SAUSAGES.—It came out in an English court a short time since that 100 worn-out horses had just been shipped from that country to Germany and Belgium to be used in the manufacture of sausage, and that such shipments were a regular thing.

THE BUILDER.

Resonance of Buildings.

There are some buildings which are so utterly bad from the acoustic point of view that even experienced speakers are little better off than novices, says Sir Morrell Mackenzie in the *Contemporary Review*. The House of Lords has, or used to have, an unenviable reputation in this respect, and in 1848 it was so difficult for speakers to make themselves heard in the French chambers that a committee, consisting of the leading scientific luminaries of the day, was appointed to study the case and suggest a remedy. After numerous experiments they hit upon a contrivance, designed on the most scientific principles, which was to make the orator's voice ring like a clarion to the farthest benches. The last state of the speaker, however, was worse than the first; he felt as if his voice was stifled under a huge nightcap, and the highly scientific sound reflector had to be discarded as a failure.

Indeed, modern public buildings are so often defective in this respect that I am not surprised to find M. Ch. Garnier, who designed the Grand Opera in Paris, exclaiming dolefully: "The science of the theatrical acoustics is still in its infancy, and the result in any given case is uncertain." One of the most remarkable buildings from the acoustic point of view that I have ever seen is the beehive-shaped temple in Salt Lake City. It holds from 12,000 to 14,000 people, and one can literally hear a pin fall. When I was in the temple, with some other travelers, in 1882, the functionary corresponding to the verger of ordinary churches, stood at the farthest end and dropped a pin into his hat, the fall of which was distinctly heard at the opposite end. The resonance of the building is so loud that branches of trees have to be suspended from the ceiling in several places in order to diminish it. It is likely enough that Brigham Young's inspiration had not a very recumbent and purely terrestrial source, for the beehive is only a slight modification of the whispering gallery in St. Paul's. The bad acoustic properties of buildings may be remedied by what doctors call "palliative treatment."

Charles Dickens' experience as a public reader made him a man of ready resource in meeting such difficulties. On one occasion, when he was going to lecture at Leeds, Edmund Yates, who had spoken in the same hall the evening before, sent him word that the acoustic conditions of the place were very bad. Dickens at once telegraphed instruction that curtains should be hung round the walls at the back of the gallery; by this means he was able to make himself more easily heard.

One of the halls in the Pioneer building of this city has its walls on three sides hung with curtains, without which it would be almost impossible to use it for public speaking.

SLATE AN UNSAFE ROOFING.—A writer in the *Milling World* says: Slate is not a safe material for mill roofs. Not long ago I saw a slate-roofed mill fired by heat from an adjoining building. The heat cracked the slates and they ran off the roof in a shower, leaving dry wood exposed to the flames. Another building covered with shingle was equally exposed, and singularly enough, the roof of the slate-covered mill took fire before the roof of the shingle-covered building. The streams of water turned on the slates after they became hot, caused their rapid destruction, while the wetted shingle were kept from hurrying. The slate roof allowed streams of water to drip downward through the entire building, while the shingle roof protected the building which it covered. Slate roofs may prevent fires from floating sparks, and shingle roofs when very dry may invite fires from such sparks, but where buildings are crowded closely together, almost any one of the roofing materials is better and safer than slate, because in the case of crowded buildings the slate is exposed to heat sufficient to break it and uncover the wood.

A CHIMNEY THAT WILL DRAW.—To build a chimney that will draw forever and not fill up with soot, you must build it large enough, 16 inches square; use good brick and clay instead of lime up to the comb; plaster it inside with clay mixed with salt; for chimney tops use the very best of brick, wet them and lay them in cement mortar. The chimney should not be built tight to beams and rafters; there is where the cracks in your chimneys come, and where most of the fires originate, as the chimney sometimes gets red-hot. A chimney built from cellar up is better and less dangerous than one hung on the wall. Don't get your stovepipe hole too close to the ceiling—18 inches from it.—*Ec.*

A NEW BUILDING SYSTEM.—A Paris architect proposes a system of building houses entirely of sheet iron, the walls, partitions, roofs and wainscoting to be composed of double metallic sheets separated by an air mattress, surrounded by different substances non-conductive of heat. The chief merit claimed for this plan is the incombustibility which it secures, and, as the metal employed allows of the most varied forms of ornamentation, the general aspect may be made as pleasing as that produced by the ordinary materials in use.



A. T. DEWEY.

W. B. EWER.

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Business Announcements.

[NEW THIS ISSUE.]

Locomotive Engines—Burnham, Parry, Williams & Co., Philadelphia, Pa.
Assessment Notice—Acme Mill and Mining Co.
Dividend Notice—Pacific Box, Salt & Soda Co.
Mining Engineers—Berwick, Moring & Hooper.

See Advertising Columns.

Passing Events.

There is very little change in the situation of affairs at the foundries. The molders are still out on strike, and work is still going out of the city to be done elsewhere. The foundrymen are getting on the best way they can with such hands as they are able to get. Only one foundry has its quota of molders, and this one is doing the casting for those other shops which are running.

The developments in quartz in Lower California are encouraging to the owners, for they find that these ledges "go down." At a depth of 350 feet the veins are found to be of good size and still rich.

More or less coal from Japan is coming now to this market, and arrangements are being made to put suitable plants in the mines of that country, so that coal shipments may be largely increased.

The men at the granite quarries at Rooklin, Placer Co., have gone on a strike, objecting to work more than nine hours.

The destruction by fire of the Cusiuhirlobio reduction works, 75 miles from Ohlnahua, Mexico, involves a serious loss. These works have been using the leaching process. They were built by a New York company.

Revival of Mining Share Speculation.

After a depression of about one year, when the shares of the Mexican and Union Mining Companies advanced from \$3 and \$2 to \$8.50 and \$7.25 respectively, the mining share market is again on the up move, with, this time, Potosi and Chollar stocks in the lead. The MINING AND SCIENTIFIC PRESS, from time to time, has called attention to the importance of the work going on, not only on those two mines, but to several others where further explorative work to the west would be rewarded by finding what is called the west ledge or Red lode. Of course it remains to be seen how rich in mineral and large it will prove, but one fact, which is already witnessed by the activity of Chollar and Potosi shares, is apparent, and that is it will revitalize speculation in the Comstock mining share market, which invariably brings into more prominence the mining industry of the coast.

That the present movement is based on merit, appears probable, yet outside speculators may, as has heretofore been the case, rush in to buy the stock regardless of what it costs, under the impression that there is a bonanza in sight. While all present information warrants the assertion that the Red lode, which is mostly gold-bearing, is very rich, yet the paying ore is not very wide; but it has a sufficient width to admit of dividends being paid by the mines that are run honestly.

In referring to the present situation, which is confirmatory of former statements made by the MINING AND SCIENTIFIC PRESS, the Virginia Enterprise of March 30th says:

In the Chollar mine the chances are very favorable that they will strike the continuation of the Hale & Norcross ore body, found on the 700 level, in the Chollar crosscuts on the 750 level toward the north end of their claim. If it is found there, the fact will be established that there are millions of dollars yet to be extracted from that ore body, which has already panned out \$1,650,000.

In the Con. Cal. & Va., a strong force of miners has been placed at work on the 1300 level on the continuation of the ore found by W. H. Patton in 1886-7 on the 1500 level. No work has ever been done on the 800 level of the Con. Cal. & Va., excepting one crosscut to the west, which was too far to the north to intercept the continuation of any ore body yet found in the mine, considering their dip and inclination, and it is in the power of no man to say that as much ore and as much money cannot be taken out of that level as has been extracted from any other level in that mine.

The Segregated Belcher mine has 1000 feet in depth of virgin ground to explore, with good prospects of finding as extensive bodies of ore as were revealed in either Crown Point or Belcher, as their work is in most interesting ground.

Overman has a most promising body of pay ore on the 1200 level, well up to the north, adjoining Segregated Belcher, upon which very little prospecting has been done, the management confining their work merely to the extraction of the ore as it is needed for the mill. It is calculated that this ore extends into the Segregated Belcher, and that it is second in importance to but few ore bodies now being worked on the Comstock.

No ledge of quartz looking as the Potosi vein from the 930 level upward does, and carrying the precious metals as it does, has ever been found on the Comstock from which millions of dollars have not been taken. The Hardy vein in the Ophir, struck in the early '80s, was probably the smallest vein found on the lode, it being only about 10 feet in width, panned out \$4,000,000, and \$1,500,000 was paid in dividends out of it. The Hale & Norcross last ore find, made after experts and practical miners pronounced the mine worked out, has already produced over a million and a half of money, and it is but partly developed as yet.

REPORTING ON MINES.—Messrs. Bewick & Moreing, mining engineers of Suffolk House, Laurence, Pountney Hill, London, have taken into partnership Mr. Edward Hooper, C. and M. E., who has been in charge of active mining operations in Nevada for a few years past. Mr. Hooper is a former pupil of one of the firm and has had several years' practical experience in managing and reporting on gold and silver mines in this country; he has also been a student at Freiberg University. He will reside in San Francisco, and it is believed this arrangement will be very advantageous for companies and individuals in England who require reports on mines on the Pacific Coast and Mexico, saving the cost and loss of time entailed by sending an engineer specially from England.

The Horn Silver mine, Utah, has struck a low grade of ore that bothers greatly to handle because of the high percentage of zinc and sulphur.

The Low Tariff on Lead.

Representatives of the smelting interests have appeared before the Congressional Committee and tried to make it appear that the lead-mining industries will be better subserved by lowering the proposed rate of duty of 1½ cents per pound on foreign lead, or of a free admission of lead in ores. This is all very well if it is intended to enrich a few people in a few localities, but if the mass of the people is to be considered the abolition or lowering of the duty would work great harm. North and west of the Rocky mountains investments in property valued at millions would be practically wiped out by free lead ores.

The smelting men assert that they must have Mexican lead ores, because the United States cannot produce a sufficient amount of wet ores or fluxing ores wherewith to smelt the dry ores, and that it is necessary to enter the Mexican market to procure the necessary fluxing ores to continue smelting operations in this country. This is all nonsense. The lead mines of Utah, Montana, Idaho, Colorado and Nevada can furnish all the lead-silver ore necessary for fluxing purposes. In truth, the lead-mining interests of this country are being vigorously assailed by those corporations which want cheaper lead ores. It is necessary for the lead miners to stand together in this emergency and combat the misstatements with the facts. The mining men of Utah and Montana have associations which are moving in the matter, but they have a hard fight to make, as the Kansas smelting men are doing their best to win.

Stewart's Mining Bill.

In this number of the PRESS we conclude a well-written and comprehensive review of the proposed mining law introduced in Congress by Senator Stewart. Our correspondent calls forcible attention to the defects of the proposed measure and the probable results of the enactment of such a law. The writer is a bonafide prospector and miner with practical experience in the work of the present laws, and is one who has given considerable attention to this subject generally.

It is to be regretted that, after Senator Stewart asked for suggestions from practical miners, he adopted none of them at all, but introduces his bill unchanged after defects have been pointed out. As that gentleman is supposed by his colleagues to thoroughly understand the wants of the miners, he has great influence. This being the case, he should have been careful to consider the proposed law in all its bearings and paid some heed to the practical suggestions made to him.

It is probable that the clauses which affect the drift-mining interests of California will be modified since the attention of other Senators and Representatives has been called to the matter. As introduced, the bill is a serious menace to these special interests, as has been pointed out in the PRESS. With reference to the quartz industry, our correspondent pretty thoroughly ventilates the bad features of the law. The letters in the PRESS of this and last week should be carefully read by miners, and they should exert what influence they can to bring to Senator Stewart's attention the defects in his proposed measure.

THE MOLDERS' STRIKE.—There have been no important developments this week in connection with the molders' strike. The foundry proprietors are confident of ultimate success. A few non-Union molders are added from time to time to those already at work in the foundries. Orders for castings have been sent East, which work would ordinarily be done here. The Risdon Works have the largest number of molders at work and are supplying other shops, but the manufacturers state they will soon have men for all, without taking any belonging to the local Union.

MECHANICS' FAIR.—The Mechanics' Fair agent reports that owing to the strike among the iron-molders, the manufacturers would make no definite promises regarding exhibitions, but said that they would make as good a showing as possible. Applications for space for exhibits in other departments are coming in fast, and a successful exposition is assured.

A NUMBER of prospectors have been forcibly ejected from the Navajo Reservation by the Indians and the United States troops.

A New Centrifugal Quartz-Mill.

(Concluded from page 229.)

as so as to turn upon their shafts. The faces of these rollers and their shoes stand parallel with the inner faces of the ring-die, so that when they are driven around by the movement of the carrier they will roll against the die. The sides traveling in the radial guides, allow the rollers to move to and from the center, and thus accommodate themselves to the character and quantity of the material which may lie between them and the die, where the grinding of the ore takes place. The construction of the machine is such that the bottoms of the rollers are kept out of contact with the surface beneath. The rollers are also prevented from being forced upward on the shafts by their movement in traveling around in contact with the die.

From the lower part of the central tank or reservoir (which is supplied with water by a hose), inclined tubes extend outwardly toward the upper end of each of the roller shafts. These shafts are made hollow and the tubes have their outer ends bent so as to enter the hollow shafts. The water thus passes below the slides and serves to wash out any grit or dirt and to act as a lubricant. Other passages extend down from the tank so that water can get down around the shaft-casing and beneath the bottom of the carrier between it and the inclined bottom of the pan, and flowing constantly outward prevents any accumulation of material which might cause undue friction.

A series of inclined plates fixed to the outer edges of the carrier travel along the bottom of the pan between the rollers, constantly lifting the pulp or ore into position to be ground between rollers and die.

By placing the roller at an incline, the centrifugal force caused by the rotation of the carrier throws them outwardly against the die, and by reason of the inclination at which they stand, they are held more firmly in contact with the die by a certain amount of gravitation due to their inclined position, and the tendency to remain in contact with the die prevents their being thrown inwardly and forced away from the die, whenever any material which is larger or harder than usual comes between them and the die. The crushing is thus steadily carried on, and there is no tendency of the rollers to bounce away from the die as they travel over it. The machine is low and compact and easily separated into comparatively small portions for shipment.

Both weight of rolls and centrifugal force combine to crush the ore. The parts of the mill are easily accessible, and it is readily cleaned up. The large screen surface gives a free discharge.

In addition to the plates below the mill there is a "slammer" or concentrator, shown in the cut. This is so arranged that by means of gates more or less of the gangue can be drawn off, leaving less work for the concentrators afterward and thus requiring less concentrating machines. This "slammer" vibrates rapidly, power being derived from the same source that drives the mill proper. At the head of the slammer the ore drops into a receptacle, filled with mercury. This is as long as the tray, eight inches wide and half an inch deep. Any amalgam is caught and held by this quicksilver.

One of these mills weighs about five tons and costs \$1500. The slammer and ore-feeder cost \$300 more, or \$1800 in all ready for the belt. Mr. Hinkle says that a five-foot mill will crush from 15 to 20 tons of hard ore per day or 25 to 40 tons of soft ore through a 40-mesh screen. H. P. Gregory & Co. are the agents for this coast. This mill is very useful in testing or prospecting mines, since, in case of necessity, it is easily moved to a new location, which is not the case with a stamp-mill.

THE MINING BUREAU WORK.—At the meeting of the directors of the State Mining Bureau on Monday, State Mineralogist's Ireland's appointments of Messrs. Miner, McGregor, Angel, Goldstone and Hobson, as field deputies to further the work of making a geological survey of the State, were confirmed. There are now nine deputies at work on the survey, for which the last Legislature appropriated \$35,000.

It is stated that a 30 foot vein of good coal has been opened 16 miles from The Dalles, Oregon, and a company has been formed to work it.

(Concluded from page 231.)

Fol. 105; . . . "That the channels were filled by the rivers themselves seems to be clearly disproved by the fact that gold is distributed throughout the whole mass, from bedrock to surface, by the sharp angular sands, and by the coated gold. Water must have flowed in the ancient rivers comparatively free from obstruction for a long period before the deposition of the gravels to admit

If bowlders were formed by river action, as believed by many writers, they would be only

says the rivers extended many hundred miles beyond), would attain an altitude of 21,500 feet. At Portwine, in Sierra county, some channels have a grade of 200 feet to the mile. Such a river commencing at that point and extending 500 miles at the same inclination, would head at an altitude of 105,000 feet above sea level. It would be vain to object that geological changes may have made the grade

Fol. 109: "Mameluke hill, near Georgetown. I esaid to cover a basin in the bedrock, the rim on all sides being higher than the central portion capped with volcanic cement. The gold is smooth-washed, coarse and heavy."

INFRINGEMENT OF A PATENT.—Peter H. Jackson has brought a suit in the United States Circuit Court against George D. Nagle for infringing on a patent for illuminating basements. Jackson says that he is the inventor of a certain method of inserting heavy pieces of glass in iron in sidewalks in such a manner as to admit light below and not interfere with pedestrians, and that Nagle is infringing on his patent. Jackson asks that he be enjoined and made to account for all profits on the sales he has made.

F. E. CHAPPELET has been appointed president of the Mayflower Gravel Mining Company in place of Henry Barroilhet, resigned. The Bank of California has also been appointed treasurer of the company instead of Bello Freres.



Fig. 1—DEAL VIEW OF AN ANCIENT LAKE.—See page 231.



FIG. 2.—THE LAKE BED COVERED BY EARTHY ERUPTIVE MATTER

The same river that conveyed and deposited the bowlders 20 tons in weight, could not have subsequently filled the interstices with the finest of silt as described by Dr. Trask, Prof. Blake, and other writers, which did not mar the perfection of the most fragile imbedded leaves.

The grade assumed by Mr. Hittell (33 feet to the mile), commencing at an altitude of 5000 feet and continuing for 500 miles (Mr. Hittell

seem greater than it was, for without a heavy
grade all river arguments fall to the ground,
nor can it be maintained that a river, dead or
otherwise, four miles wide as claimed by Dr.
Trask, could transport the immense boulders
described and place them as stated. It is well
known that modern subglacial streams have
generally a similar grade, yet they are all loose
and owe their birth to the melting ice. Those
of the great Muir glacier, described by Prof.

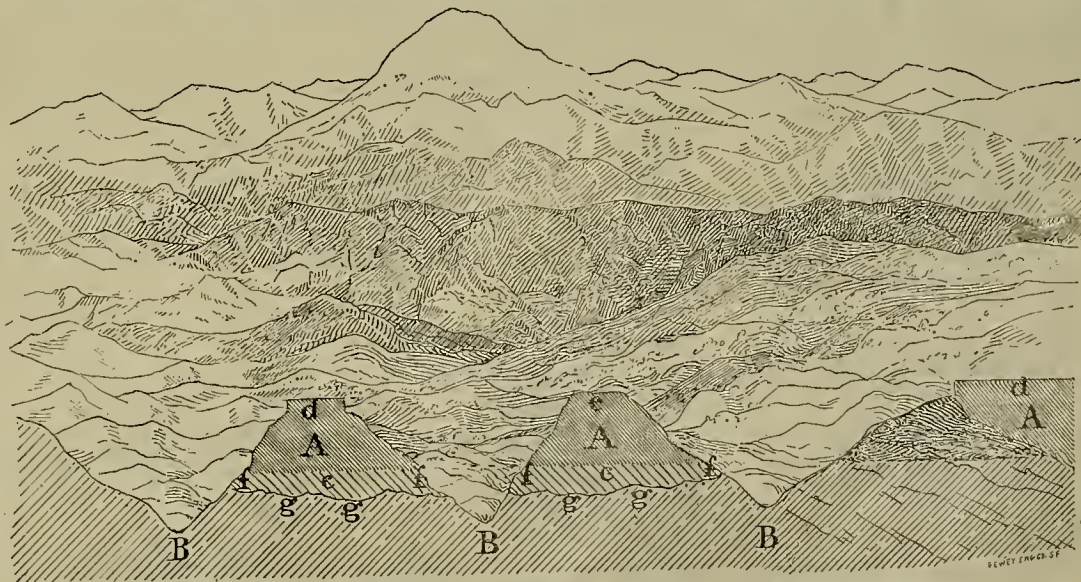


Fig. 3.—RESULT OF GEOLOGICAL CHANGES PRODUCING PRESENT CONDITIONS

The Astronomical Society.

The annual meeting of the Astronomical Society of the Pacific was held on Saturday evening last. Prof. E. S. Holden presided. As the retiring president he submitted a report on the work done at the Mt. Hamilton Observatory. He said that there were not sufficient accommodations at the observatory for the scientists stationed there, and complained that during the winter they were put to extremities to keep warm.

Prof. Schaeberle of the Lick Observatory gave a most interesting account of his trip to South America to view the total solar eclipse on Dec. 21, 1889. He told about the customs of the people of the island of Cayenne, and views of the people and country were thrown upon a screen. Photographic views of the eclipse were also shown.

The president appointed W. M. Pierson, F. H. Haumann and J. J. Jones a committee to inquire into the proposition of establishing an observatory in the city, as suggested by one of the members.

The annual election for directors resulted in the choice of the following gentlemen: E. S. Holden, Frank Soule, J. M. Schaeberle, Chas. Borchhalter, William M. Pierson, C. B. Hill, J. H. Wythe and F. R. Ziel, Publication Committee—E. S. Holden, J. E. Keeler and C. G. Yale (of the MINING AND SCIENTIFIC PRESS). The directors elected the following officers: President, E. S. Holden; vice-presidents, W. M. Pierson, Frank Soule and J. H. Wythe; secretaries, J. M. Schaeberle and Chas. Borchhalter; treasurer, E. J. Molena.

The following new members were elected: H. C. Lion, H. M. Hickox, Mrs. H. A. Harlaod, H. T. Bestoe and Harry Darbrow of San Francisco; George Gleason of Berkeley, A. W. Craig of Oakland, Miss M. E. Chaso of Santa Rosa, Mrs. Harriet Wright of Denver, Col.; Andrew Greig of Tayport, Scotland; Herbert Ladler, F. R. A. S., of London, Eng.; W. H. Maw, F. R. A. S., of London; John Tebbutt, F. R. A. S., of Windsor, New South Wales; Ewell Davidson of Branscombe, Queensland; A. Stanley Williams, F. R. A. S., of Brighton, England; O. A. H. Pihl of Christiania, Norway; and Miss Dorothea Klawke of Paris, France.

Assessment Notices.

ACME MILL AND MINING COMPANY; location of principal place of business, San Francisco, California. Location of Works, Amador County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 20th day of March, 1890, an assessment, No. 10, of 3 cents per share, was levied upon the Capital Stock of the Corporation, payable immediately to United States Gold Coin to the Secretary, at the office of the company, Room 11, No. 303 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of May, 1890, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, THE 9th DAY OF JUNE, 1890, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
J. M. BUFFINGTON, Secretary.
Office, Room 11, No. 303 California Street, San Francisco, California.

DIVIDEND NOTICE.

OFFICE OF THE PACIFIC BORAX, SALT AND Soda Company, San Francisco, March 31, 1890. At a meeting of the Board of Directors of the abovesaid Company, held this day, a Dividend (No. 30) of One Dollar (\$1.00) per share was declared, payable THURSDAY, April 10, 1890, at the office of the Company, No. 230 Montgomery Street, Rooms 11 and 12. Transfer Books close April 6, 1890, at 3 o'clock p. m.

ALTON H. CLOUGH, Secretary.

Practical Treatise on Hydraulic Mining.

By AUG. J. BOWIE, JR.

This new and important book is on the use and construction of Ditches, Flumes, Dams, Pipes, Flow of Water on Heavy Grades, methods of mining shallow and deep placers, history and development of mines, records of gold washing, mechanical appliances, such as nozzles, hardy-gurds, rockers, undercurrents, etc.; also describes methods of blasting; tunnels and sluices; tailings and dump; duty of miners' inch, etc. A very practical work for gold miners and users of water. Price, 25¢, post-paid. For sale by Dewey & Co., Publishers, 220 Market St., San Francisco.

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NEW HAVEN CONN.

P. O. Box 496.

A MIDDLE-AGED MAN BY THE NAME OF JOSEPH McLEARN, Miner, left Nova Scotia 17 years ago for California. His friends would be thankful to any person who could give any information concerning his whereabouts.

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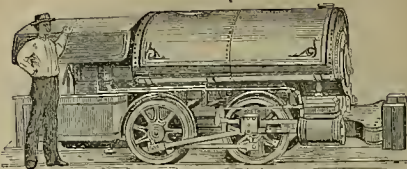
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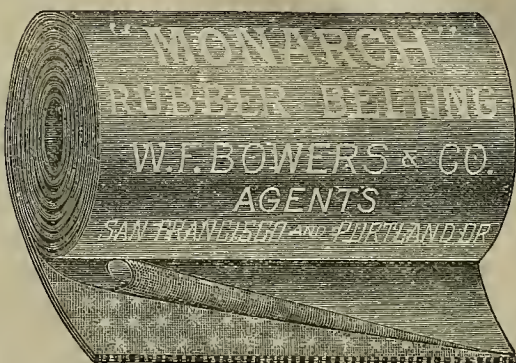
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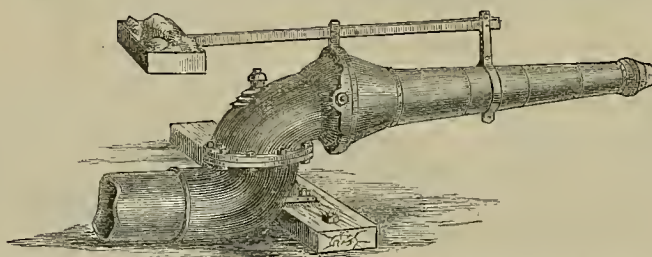
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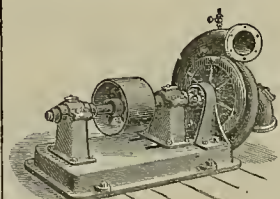
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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING MARCH 25, 1890.

- 423,981. — TICKET HOLDER FOR MARKING GOODS — Samuel Bauman, Santa Cruz, Cal.
 424,045. — STEAM-MOTOR FOR PUMPS — H. O. Beatty, Sacramento, Cal.
 424,264. — FEED-ROD FOR ORE STAMP-MILLS — J. R. Brett, Oakland, Cal.
 424,046. — BALING PRESS — Walter Bullard, Chico, Cal.
 424,269. — STREET RAILWAY CAR-TRUCK — W. M. Cary, S. F.
 423,990. — UMBRELLA ATTACHMENT — M. Dattlebaum, S. F.
 424,285. — CAR COUPLING — F. A. Fox, S. F.
 424,287. — CHOCK BLOCK FOR LOGGING TRUCKS — W. H. Garlock, Seattle, Wash.
 424,205. — AX-HEAD — F. L. Hufford, Arcata, Cal.
 424,002. — FRUIT-GRADER — D. D. Jones, Santa Clara, Cal.
 424,212. — WIND-GUARD — John Keane, S. F.
 424,005. — ICE MACHINE — J. C. Kitton, S. F.
 423,935. — WATER-WHEEL — Chas. LeDuc, Crescent, Wash.
 424,125. — COOLER — A. McDowell, Selma, Cal.
 424,020. — FENDER FOR FEED-TROUGHS — Hans Nisson, Sacramento, Cal.
 423,944. — RAILWAY SWITCH — Chas. H. Ohm, S. F.
 424,348. — BRAKE SHOE — N. K. Pearson, S. F.
 424,025. — MACHINE FOR SHARPENING TOOLS — A. H. Richardson, S. F.
 424,133. — CAN-CRIMPING MACHINE — F. A. Robbins, S. F.
 424,145. — DOOR-HANGER TRUCK — H. P. Talbot, Portland, Or.
 424,388. — ROPE CLAMP — J. Weigel, S. F.
 17,709. — TRADE MARK — H. W. McIntyre, Vina, Cal.

The following brief list by telegraph, for April 1, will appear more complete on receipt of mail advices:

California — George A. and C. F. Fleming and G. T. McLaughlin, San Jose, fruit-picking and spreading machine; Edward S. Geron, Lafayette, assignor of half interest to J. Eva, S. F., reversible plow; Elam Harter, San Diego, step-ladder; John L. Heald, Crockett, steam boiler; John Hellrath, Plymouth, two-wheeled vehicle; same, adjustable vehicle seat; Ernest L. Ransome, S. F., mold for molding concrete continuously; Daniel S. Reagan, S. F., gas engine; John C. H. Stut, S. F., automatic cable lifter for cable railway; same, automatic tension device for cable railway; Lewis A. Turner, assignor of half interest to W. D. Bahcock, Los Angeles, rail climber for vehicle wheels; Louis Zander, Oakland, lamp-burner.

NOTE. — Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

COOLER. — Albert McDowell, Selma, Fresno Co., assignor of one-half to J. A. Stroud. No. 424,125. Dated March 25, 1890. This is one of that class of coolers in which the evaporation of water is made to rapidly take place by exposing a considerable surface of saturated fabric whereby the temperature within the cooling vessel is lowered. The invention consists in a suitable vessel for the water, having within it a vessel for the material which is to be kept cool, covers of fabric or other suitable absorbent material fitted to the outside of the water vessel and having end flaps rolling over the edge of said vessel into the water, rolls of absorbent material or fabric passed around the exterior of the vessel and having extension flaps projecting into the water, an outer belt or hand fitted around the vessel outside the rolls, whereby an air space is formed between said belt or hand and the vessel, a suitable roof or top for the vessel with absorbent coverings, and certain minor details of construction and arrangement.

FRUIT GRADER. — David D. Jones, Santa Clara. No. 424,002. Dated March 25, 1890. This is one of that class of machines for separating fruit according to sizes and usually known as fruit-graders. The fruit is placed in a box at the head of the machine and falling upon an inclined grated surface rolls down toward the lower end, and in passing over said surface, fruit below a certain size drops through the spaces between the bars of the grated surface and through between the slats of the rack below and upon the inclined bottom of the box and is discharged into a suitable receptacle. The fruit above a certain size failing to pass through the grated surface, passes down over the end and is received in a suitable receptacle. When any of the fruit sticks or clogs between the bars of the grated surface, the rack below is raised up so that its slats come up between the bars of the grated surface and thereby free the fruit whenever it is necessary. The spaces between the slats are wider than those between the bars and the former therefore present no obstruction to the passage of the fruit.

UMBRELLA ATTACHMENT. — Marcus Dattlebaum, S. F. No. 423,990. Dated March 25, 1890. This invention consists essentially in a receptacle adapted to be readily attached to and detached from the pointer end of the umbrella stick, whereby when the umbrella is closed the water running from it shall drip into the receptacle. The drip falling into this

little detachable cup or attachment is prevented from soiling the carpet or other surface upon which the umbrella is placed. The little cup or bulb is preferably made of rubber, and is carried about in the pocket. After it has been in use it is removed from the umbrella, inverted, and the collected water poured out. Being a rubber bulb, the water is easily squeezed out.

MACHINE FOR SHARPENING CUTTING TOOLS. — Albert Richardson, S. F. No. 424,025. Dated March 25, 1890. This invention relates to a machine designed to sharpen files, saws, and all that class of tools which have irregular cutting edges, such as cannot ordinarily be sharpened except by the use of a file or similar tool. The inventor takes thin disks of paper, pasteboard, wood-pulp fiber, or other easily cut material, and coats one or both surfaces with a preparation of corundum, emery or other hard fine grit or powder, which is mixed with a proper cement which will bind it firmly to the disk. The disks are made of any suitable size, depending on the size of the teeth to be cut. For sharpening a saw the disks are thicker and separated a greater distance than for files. The disks are mounted on a spindle and are revolved rapidly. The cutting is done by the hard powder which forms the surface of the disks, and which is sufficiently hard to cut a file or any tool of steel without drawing the temper. The paper or soft material wears away gradually so as to keep a perfectly sharp edge upon the emery disks until they are entirely worn away, the paper serving simply to support a coating of emery which would be too thin to support itself and do the work required. The disks may be mounted in gangs and be driven in any suitable way.

ICE MACHINE. — John O. Kitton, S. F. assignor of one-half to Wm. T. Garratt & Co. No. 424,005. Dated March 25, 1890. This improvement in ice machines consists of a series of vertically disposed freezing channels within a tank having insulating chambers within which the freezing medium is circulated around these freezing spaces, and in combination therewith of a series of vertically-arranged transverse sliding boxes or hollow removable partitions, which are dropped into the aforesaid channels to provide end-spaces, through which the freezing medium is circulated, so that refrigeration is carried on at points intermediate in the length of the chambers as well as at the sides. These supplemental removable transverse freezing-chambers or partitions may be employed in connection with other forms of what are known as "can" or "plate" machines, the object being to apply the freezing medium at the ends as well as the sides of the water-containing chambers and also at a number of intermediate points in the length of the chambers to increase the freezing capacity.

STEAM-MOTOR FOR PUMPS. — Henry O. Beatty, Sacramento. No. 424,045. Dated March 25, 1890. The object of this invention is to simplify the construction of that class of steam-motors or engines exemplified by Patent No. 408,400 issued to the same inventor August 6, 1889.

BALINO PRESS. — Walter Bullard, Chico, Butte Co. No. 424,046. Dated March 25, 1890. The object of this invention is to provide a compact, effective and rapidly operating press. The patent covers several constructions, arrangements and combinations of parts.

FENDER FOR FEED-TROUGHS. — Hans Nisson, Sacramento. No. 424,020. Dated March 25, 1890. The invention relates to the class of feed-troughs which are provided with adjustable gates or fenders, the purpose of which is to prevent or allow access to the trough as may be desired. A series of bent brackets are hinged to posts and the central portions of these brackets connected together by plate or wire. When access is to be had to the trough, the brackets are turned simultaneously by a lever so as to carry the rails or wires parallel with the trough, affording perfect access to it. By swinging the brackets back again the wires or rails are put in such a position that stock cannot get access to the trough.

MINERAL DISCOVERIES. — Reports of rich mineral discoveries in the Carrizo mountains, on the Navajo Indian Reservation, in North-eastern Arizona, have resulted in the organization of several parties of prospectors in Arizona and New Mexico, who have gone to locate claims. The Government, as well as the Indians, are opposed to the prospectors entering the reservation, and the result of this expedition is watched for with much anxiety. The Carrizo mountains are 125 miles north of Gallup, on the Atlantic & Pacific railroad.

A COMPANY entitled the Patriot Silver Mining and Milling Co. has been incorporated under the laws of Nevada to work the Patriot mine in Yankee Blade district, Lincoln county, leased from the Manhattan Co. for a period of two years, giving that company a royalty of ten per cent on all ore extracted.

THE Yuma Sentinel says a large deposit of rock salt has been found in Silver District, Arizona, three miles from the Colorado river.

IRVING M. SCOTT of the Union Iron Works has returned to San Francisco from Washington,

Coast Industrial Notes.

The new foundry at Astoria started up on March 16th and turned out 240 window-sash weights.

THE Yuma Sentinel says that county has several deposits of antimony that could be worked with profit.

THERE is a great demand for lumber vessels at all Puget Sound lumber-mills. Coasting vessels have gone on deep water, and freights have advanced from \$4.50 to \$5.50 a thousand feet.

GROUND was to be broken last week at the corner of Thirteenth and Franklin streets, Oakland, for the electric street-railway of the Oakland and Berkeley Rapid Transit Company.

A FACTORY for condensing milk and coffee has been built at Buena Park, five miles from Anaheim, Los Angeles county. It was started up for business last Wednesday and was inspected by many visitors. When in full operation it will use the milk of 3500 cows every day. The plant cost \$20,000.

THE reason attributed for the non-arrival of foreign coal is that until a short time ago there were very few deep-water vessels leaving port for England or Australia. A great many wheat-laden vessels have left here, however, within the past month, and there is a great number now in port loading for Europe, many of which will return here with coal.

THE fruit and vegetable commission merchants doing business in this city have begun a movement to shorten their business hours. It has been a custom for many years to open the stores in that line of business at 2 and 3 o'clock in the morning. As there appears to be no reason why these unearthly hours should be observed, it is now proposed to open at 5 A. M. Many of the leading merchants are in favor of the change.

MR. McKENNA introduced a bill in the House to provide a station for silk culture in the State of California. It provides that the Secretary of Agriculture shall purchase not less than thirty nor more than forty acres in the State, of which fifteen shall be planted in mulberry trees and the land shall be used to cultivate young mulberry leaves, and to provide silkworm eggs and cocoons for distribution. There is to be one superintendent at \$2000 and an assistant superintendent at \$1800 per annum, and the sum of \$30,000 is provided for the expense of the farm for the first fiscal year.

T. B. McGOVERN, representing large Chicago and New York houses which make a specialty of handling canned salmon, is in Portland, Oregon. He has placed orders here for years past for from 30,000 to 50,000 cases of Columbia river salmon, but will not try to do business with the Columbia river cannerymen this season. He says the tendency all along the line is for lower prices, and British Columbia salmon is now quoted in the English market on an equality with standard brands of Columbia river salmon, and cannerymen there realized the condition of affairs on the Columbia river, and being able to get raw fish almost as cheap as in Alaska, intend forcing the business, and a number of new plants will be put in operation. The ideas of the trade generally as to prices range from \$1 for Alaska to \$1.25 for Columbia river brands, and at the prices fishermen on the Columbia river are demanding for raw fish it is utterly impracticable for cannerymen to do business.

THE officials of the North Beach & Mission Railway Company state that the road will soon be changed into a cable line. It is expected the change will be made during the early part of the coming summer, draymen being already engaged on the plane. The line will extend ten miles, starting at Townsend street and running along Fourth to Market, across Market to Stockton, to Geary, down Geary to Kearny, to Broadway, to Powell, to Montgomery avenue, along the latter thoroughfare to Mason, and on Mason to the bay. The other route will extend the entire length of Foley street, from its commencement to East street, and along East street to the ferries. Then it will run up Market street to California street, on California to Kearny, on Kearny to Market, on Market to Eighth, and on Eighth to Folson. The old headquarters at Fourth and Louisa streets will be torn down and a great power-house erected. It will be as large as any in the city, and will have none but the finest machinery.

"WANTED" — 2000 men to work on railroad. Pay, \$2 to \$2.50 per day. This sign in large letters was placed in the window of the steamship and railroad ticket office, corner of Montgomery avenue and Vallejo street, and was displayed on the bulletin-board of a Clay-street employment office, one day last week. It is a genuine offer for laborers, and yet there was no great demand from the unemployed during the day, because it would cost each man about \$12 or \$15 before he could reach his work. The order is from the Portland contractor of the Union Pacific railroad, who want 1500 able-bodied men for Oregon and 500 for Utah to work on the U. P. extension. About 100 men, mostly Italians, have already been engaged in this city. The men will be required to pay \$2 office fee for securing the job, \$3 on the steamer and 1 cent per mile on the railroad from Portland to point of destination. They must have blankets. Board will cost them \$5 a week, and the job will last all summer. Common laborers will get \$2 a day, "rook men," or those driving dumpcarts, \$2.25 a day, and "headers for tunnel work," or those shoveling and picking in tunnels, \$2.50 a day,

Sampling Ores.

We should be obliged to our esteemed contemporary, the Virginia Enterprise, if when it considers it necessary to criticize any statements made by the MINING AND SCIENTIFIC PRESS, it would first make sure that it is crediting its "clipping" to the right journal. The Enterprise reads the PRESS a lecture for casting reflections on the milling and mining management of the Comstock, in saying: "The Golden Chariot is the only mine on the Comstock that returns the average value of its ore as per car sample."

THE PRESS never made any such statement, nor did any of its correspondents. So the little "fing" of the Enterprise about having to teach writers on mining papers how to write up mining information, is not quite to the point. Our contemporary has probably taken it from some other paper and credited it to the MINING AND SCIENTIFIC PRESS.

We have had no articles of late on the subject of sampling ores, except one on "Car and Battery Assays," emanating in the form of a general letter or circular, from the officers of the Mining Stock Association of this city. That circular was reprinted and duly credited to its source, so that the Enterprise could scarcely hold the PRESS responsible for anything therein contained. The argument of the Mining Stock Association was for the publication of both car and battery assays in the interest of the speculative public, and the management of the Overman Mining Company was commended for making a new departure in giving in its report the figures of both car and battery assays.

THE PRESS published this as it would any other news connected with mining matters, with no additions or comments, simply stating in a prefatory sentence that the "following letter was written by the officers of the Mining Stock Association." On this claim basis, for we can think of no other, the Enterprise builds its article. No writer on this paper had anything to do with originating the circular or letter; and no such statement as the Enterprise credits us with was ever published in the MINING AND SCIENTIFIC PRESS.

From Johannesburg.

William Munro, who left the Comstock last summer for the South African gold-fields, has written a letter to a friend in Virginia, descriptive of his trip and of the country in which he is at present working.

MR. Munro embellishes his facts with but few adjectives, and tells a tale that knocks more romance out of South Africa in a minute than the English packet lines and mining shareholders can plant in a year.

Following are sentences reproduced from his letter verbatim:

"I have not seen a person since I left Virginia that I ever saw before. One vessel called at Flushing, Canary Islands and at St. Helena. The latter is the most miserable place I ever saw. I didn't have time to visit Napoleon's grave. I am very much disappointed with Johannesburg. Why people write such glowing falsehoods about this place I cannot understand. There is a great large town built all over the country, and it is full of people trying to live off their wife. The mines are all incorporated, and many of them have sold for high figures, but now they are very low, and many who have made money here are now losing it. Not one-half of the mines pay half the expense of working them. Their stock is unassessable, and when a company is out of money they lease new stock for working capital. Most of the rock is very low grade, and they can save but a small percentage of the gold in it. Living is very high and very poor. Wages are low. Natives do the work, directed by the whites. There is a great deal of typhoid fever. The water is not fit to drink. It looks like milk after a shower, and remains muddy two or three days. We have terrific sandstorms, when we cannot see five feet ahead. A great many people die here of inflammation of the lungs, brought on by the inhalation of sand. Coming here, I met at least 300 men returning to the railroad. They could find nothing to do. The ground is staked off for miles in every direction. I am working in a mine, and if my health keeps good until I make enough to take me out of here I will be happy. They have schemes to get money out of you here that I never heard of before. You may think I have drawn a dark picture of this place, but I have not pictured it half as bad as it is. Those who do not believe me had better come and see."

DURING the past year there were hoisted from the Hale & Norcross mine 27,962 tons of ore and 43,100 tons of waste, and have run 4637 feet of drifts. The gross bullion yield of the ore milled was \$519,117.58.



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IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER
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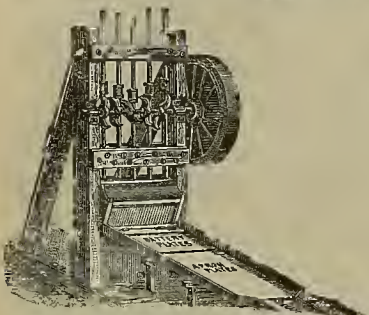
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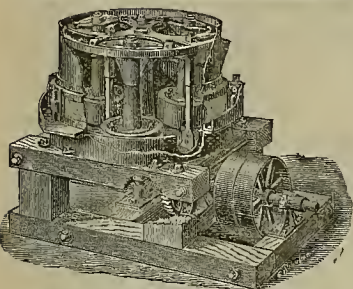
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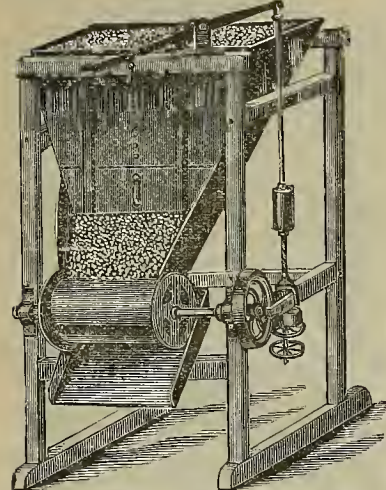
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In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar for repairs.

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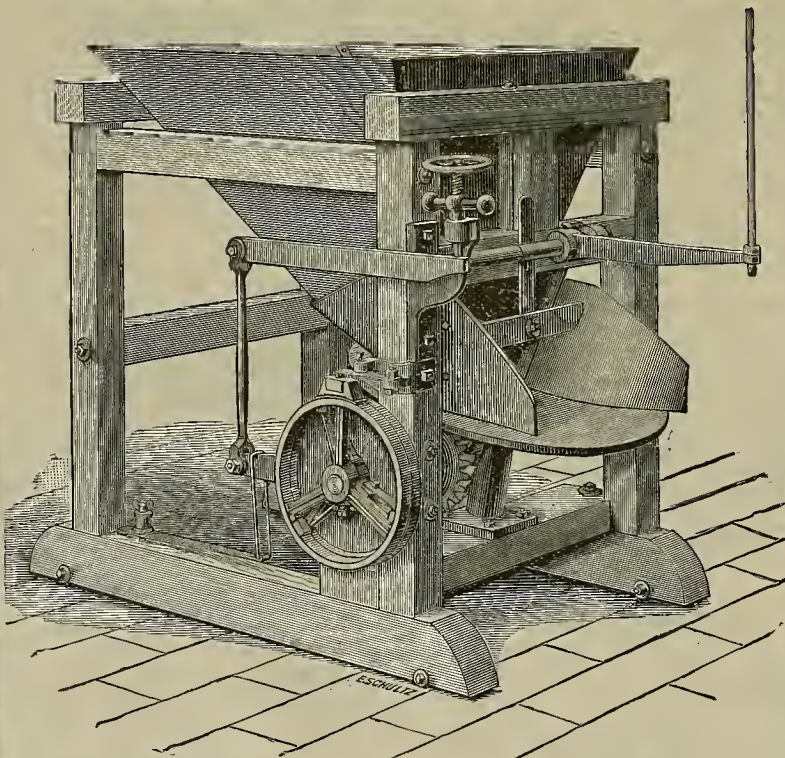
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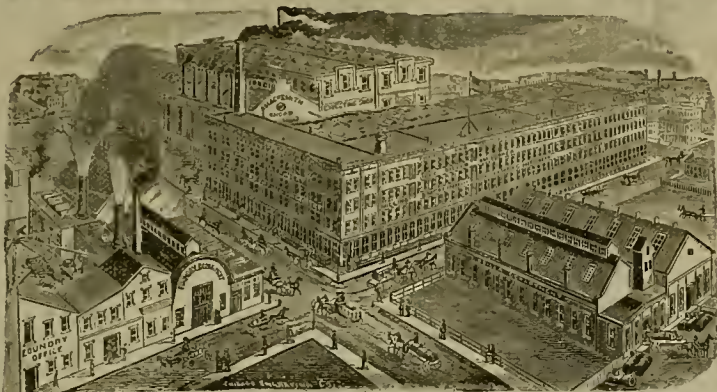
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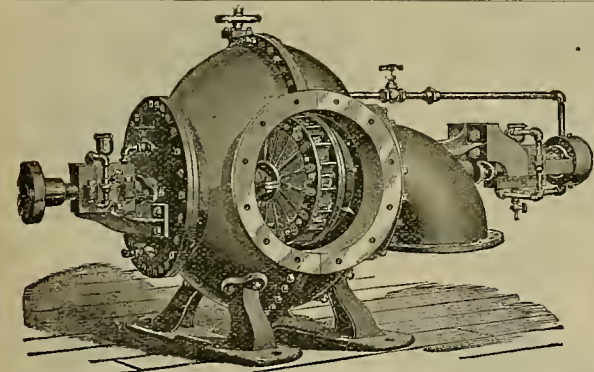
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No imitation, no deception, no plausibly or rotten iron used. Only genuine Russian iron in Quartz Screens. Planished iron screens at nearly half my former rates. I have a large supply of Battery Screens on hand suitable for the Huntington and all Stamp Mills, which I will sell at 20 per cent discount.

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Laundry Free for the use of Families.

HOT and COLD BATHS FREE.

Terms, Board and Room, \$1.00 per Day
And Upward.

Rooms with or without Board.

Free Coach to the House

J. POOLEY.

MARKET REPORTS.

Local Markets.

SAN FRANCISCO, April 3, 1890.

General trade continues free, with the volume of goods going out in excess of that at this time last year. Although the past winter was the most severe the merchants, manufacturers and business men in general have passed through for several years past, yet the failures reported were light, while the future betokens a very promising year.

The iron-molders' strike is still on, but foundrymen are determined to hold out to the end. Each day adds one or more iron-molders to the force they have employed.

The money market is quite easy. The quarterly dividend and interest disbursements are very heavy, which tends to ease the market, as does the transfer of the Nevada Bank into the control of other parties. The money that has been tied up can now be placed, while the new subscribed capital of \$3,000,000 can be put on interest. The retention of Mr. Davidson as cashier gives satisfaction to all who have dealings with the bank. The officers and directors are leading representative business men, which insures to the institution a good business and a first-class standing.

Remittances from the interior are free. The City Treasurer's disbursement in March aggregated nearly a quarter of a million dollars, and the money still on hand on April 1st aggregated nearly \$1,700,000.

MEXICAN DOLLARS—The market continues dull at 75¢@75½ cents. Importations are light.

SILVER—Receipts continue light, not meeting the Mint's wants. Exporters are still out of the market. This is partly due to the low rate of sterling exchanges. As India's cereal crop will begin to move soon, it is not at all unlikely the export movement will start up within the next 30 or 40 days. The markets abroad and at the East have gained in strength under fairly light supplies and a good, steady demand. Silver is favorably influenced by the action of Congress toward the metal. The opinion is gaining ground that at this session of Congress a bill will be passed which will soon bring silver up to par. So far as we can ascertain, the belief obtains that the Windom bill as amended will be the one.

The local market for silver has held steady at 95.25 cents Mint prices. The Mint bought this week 97,000 ounces. A sale of 30,000 ounces was made direct to-day to the Department at Washington at a slight advance on Mint prices here. This indicates that the price will be soon advanced here.

London cables received to-day quote silver unchanged.

QUICKSILVER—The market continues to rule very strong under a good home demand and a fair export inquiry. The Comstock mines have bought very freely. The mines (deep and gravel) in this State and up north are beginning to buy more as transportation improves. Receipts the past week aggregate 94 flasks, and exports by sea one flask to Victoria.

BORAX—Receipts the past week aggregate 212 ctns., and exports by sea 115 lbs. to Honolulu. The market is not quite so strong.

LIME—Receipts the past week aggregate 5674 bbls., and exports by sea 373 bbls. to Honolulu. There is a continued increased consumption, due to more buildings and other improvements under way.

TIN—Exports by sea the past week aggregate 6088 pounds to Victoria. The local market for both pig and plate shows no material change deserving of particular mention. Foreign advices, generally, have an easier tone.

COPPER—From the best obtainable information, the markets at home and abroad are gradually working into better position for the selling interest. The consumption is steadily increasing, while the output of the mines as yet shows no material increase.

IRON—The market continues sluggish, but so far as we can learn, there is no disposition to press sales. With more iron-molders given employment, the consumption of iron will steadily increase. Foundrymen are confident of being able to secure in time all the iron-molders wanted, and at their own terms, too.

COAL—Imports the past week aggregate as follows: From Tacoma, 2750 tons; Coos Bay, 1860; Seattle, 3670; Departure bay, 3735; Comox, 4300; Nanaimo, 4300. Total, 19,616 tons. The market holds strong for Australian and Wellington, and fairly firm for other brands. The offerings of Australian continue light. For a cargo of Grete, \$7.25 was freely bid but refused. As our wheat crop promises to be very large and the tonnage on the way is light, there may be, later on, more vessels listed from Australia so as to take advantage of any advance in freight for next season's business. Of course this will develop itself later on.

Eastern Metal Markets.

By Telegraph.

NEW YORK, April 3, 1890.—The following are the closing prices the past week:

	Silver in	Silver in	Lead.	Tin.
Thursday....	43 13-16	95	\$14 30	\$3 90
Friday.....	43 13-16	95	14 30	3 90
Saturday....	43 13-16	95	14 30	3 90
Sunday.....	43 13-16	95	14 30	3 90
Monday.....	43 13-16	95	14 30	3 90
Tuesday....	43 13-16	95	14 30	3 90
Wednesday..	43 13-16	95	14 30	3 90

NEW YORK, April 2.—Borax was more plentiful, Lower California refined, 9½¢. Quicksilver nominal at 69¢@70¢. In copper there is a Boston rumor of large sales at 14¢, but here 14½¢ is a rejected bid; 14½¢ asked for casting brands; quoted steady at 12½¢@13¢. Pig lead is slow and easier, 33.90 bid a single car.

FLOUR is \$4 a hundred pounds at Sierra City, and the Sierra Buttes Mining Company has quit selling.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, April 3, 1890.

ANTIMONY—None in market	71¢	—
BRASS—Refined, in carload lots	71¢	—
Powdered	71¢	—
Concentrated	62¢	—
All grades jobbing at an advance		
COPPER—		
Sheet	23¢	25
Sheathing	23¢	25
Ingot, jobbing	17¢	13
do, wholesale	—	16
Fire Box Sheets	23¢	25
LEAD—Pig	44¢	—
Bar	5¢	—
Sheet	7¢	—
Pipe	6¢	—
Shot, discount 10% on 500 bags	Drop, ½ bag	1
Buck, ½ bag	1 85¢	—
Obilid, do	1 85¢	—
TINPLATE—B. V. steel grade, 14x20, to arrive	—	—
B. V. steel grade, 14x20, spot	46¢	—
Charcoal, 14x20	6¢	—
do, roofing, 14x20	6¢	—
do, do, 20x28	12¢	—
Pig tin, spot, ½ lb.	—	21½
COKE—Eng. ton, spot, in blk.	13 50	21 50
do, to load, ½ ton, in blk.	14 50	21 50
QUICKSILVER—By the flask	50 00	—
Flasks, new	—	—
Flasks, old	35¢	—
CHROME IRON ORE, ½ ton	10 00	—
IRON—Bar, base	3 40	34
Norway, base	42¢	51
STEEL—English, lb.	16¢	20
Canon tool	9¢	9
Black Diamond tool	8¢	10
Pick and Hammer	4¢	6
Machinery	4¢	6
Toe Calk	44¢	—
IRON—Cleansbrook ton	35 00	—
Eghington, ton	35 00	—
American Soft, No. 1, ton	—	32½
Oregon Pig, ton	—	35 00
Puget Sound	—	35 00
Clay Lane White	—	27½
Bar Iron (base price) ½ lb.	—	—
Langlois	—	34
Thorndike	—	34
Galbarrie	—	34
Barrow	—	34
Tomas	—	34
Cargoeet	—	32 50

Lumber.

Pine, Fir and Spruce.

	RTAIL.	JOBBING.
Rough Pine, merchantable, 40 ft.	\$20 00	\$17 00
41 to 60 ft.	21 00	18 00
61 to 80 ft.	23 00	20 00
81 to 100 ft.	27 00	21 00
1x3, fencing	22 00	19 00
1x4	21 00	18 00
1x3, 1x4 and 1x6, odd lengths	19 00	16 00
Second quality	17 00	16 00
Selected	24 00	22 00
Clear, except for flooring	31 00	23 00
Clear for flooring	2 00	—
Clear V. G. No. 1 flooring	14 00	10 00
Firewood	14 00	10 00
Dressed Pine, 1x4, 1x6, 1x8	34 00	29 00
No. 1, 1x4	34 00	30 00
No. 1, 1x4, 1x6, and odd sizes	37 00	33 00
All sizes, No. 2	27 00	24 00
Stepping, No. 1	34 00	30 00
Stepping, No. 2	27 00	24 00
Ship timber and plank, rough	27 00	24 00
Selected, planed 1 side, 4x6 40 ft.	32 00	28 00
Shot, No. 1	33 00	29 00
" " 2	35 00	30 00
" " 3	35 00	30 00
" " 4	35 00	30 00
Deck plank, rough, average 36 ft.	35 00	32 00
Dressed, average 35 feet	40 00	36 00
Pickets, rough, B. M.	20 00	16 00
1x14, 4 ft long, ½ M.	6 50	6 00

Coal.

	Per Ton.	Per Ton.
Australian	7 60	7 75
Liverpool S. M.	8 60	8 60
Scotch Splint	9 00	9 00
Cardiff	9 50	10 00
Wellington	8 00	8 00
Greta	8 50	8 50
Westminster Brynab	9 00	9 00
Nansimo	9 00	9 00
Sydney	8 50	8 50
Gilman	7 00	7 00

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, department 10, San Francisco:

MOTHER LODE G. M. Co., March 31. Location, Calaveras county. Capital stock, \$500,000. Directors—G. Silberman, J. Silberman, James Grady, A. Silberman and G. Mahoney.

CALIFORNIA ADAMANT WALL PLASTER CO., March 31. Object, to mine for gypsum, and to deal in wall plaster material. Capital stock, \$500,000. Directors—R. H. Chase, M. Leventritt, J. V. Miller, Marks Green and J. R. Jarboe.

AMERICAN GAS GOVERNOR CO., March 31. Capital stock, \$100,000. Directors—A. Ford, Franklin Ellis, D. L. Randolph, W. O. Ludovici and J. W. Palmer.

OAKLAND ELECTRIC CONSTRUCTION CO., March 31. Capital stock, \$1,000,000. Directors—Tbos. Trebell, J. J. Scoville, H. Humphrey, W. B. Reynolds and J. H. Smith.

HAHNEMAN HOSPITAL OF S. F., March 31. Object, benevolence and charity. Directors—W. Norris, E. R. Lilienthal, W. P. Fuller, Leon Sloss, S. B. Cushing, F. S. Cbadbourne and J. R. Jarboe.

RICHARDS DRUG CO., March 31. Capital stock, \$250,000. Directors—C. F. Richards, M. E. Ogborn, Paul Lobse, C. Carpey and R. F. Bunker.

GAIVAN DRUG CO.—April 1. Capital stock, \$10,000. Directors—E. Newman, J. W. Lowe, W. J. Gavigan, T. F. Gavigan, J. S. Gavigan.

BUSH AND MALLETT CO., April 1. Object, to handle apparatus connected with electric lighting. Capital stock, \$50,000. Directors—H. T. Bush, J. H. Mallett, Jr., Charles F. Mallett, H. C. Whittemore and A. B. Tennant.

Bullion Shipments.

We quote shipments since our last and shall be pleased to receive further reports:

Cons. California and Virginia, March 29, \$60 038; Commonwealth, April 2, \$28,000; Justice, 2, \$3184; Mt. Diablo, 2, \$9661.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	No. Ass't.	LEVIED.	DELIN'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alabama Co.	Nevada	11	Mar 13	Mar 13	Mar 13	W. H. Watson	302 Montgomery St.
Bechtel Cons M Co.	California	11	Feb 10	Mar 17	Apr 13	C. C. Harvey	303 California St.
Bailey M Co.	Nevada	1	Mar 18	Apr 22	May 13	W. H. Watson	302 Montgomery St.
Butte King M Co.	California	1	Feb 13	Mar 20	Apr 12	W. O. Lewis	723 Market St.
Confidence S M Co.	Nevada	13	Feb 13	Mar 20	Apr 12	W. O. Lewis	723 Market St.
East Best & Belcher M Co.	Nevada	1	Feb 13	Mar 20	Apr 12	W. O. Lewis	723 Market St.
Eureka Cons Drift M Co.	California	1	Feb 13	Mar 20	Apr 12	W. O. Lewis	723 Market St.
Happy Valley Bl. Gravel Co.	California	1	Feb 13	Mar 20	Apr 12	W. O. Lewis	723 Market St.
Holmes M Co.	Nevada	1	Feb 13	Mar 20	Apr 12	W. O. Lewis	723 Market St.
Imbolto M Co.	Nevada	1	Feb 13	Mar 20	Apr 12	W. O. Lewis	723 Market St.
Indian Creek M Co.	California	1	Feb 13	Mar 20	Apr 12	W. O. Lewis	723 Market St.
Martin White M Co.	Nevada	23	Feb 13	Mar 20	Apr 12	W. O. Lewis	723 Market St.
Maxflower Gravel M Co.	California	46	Feb 13	Mar 20	Apr 12	W. O. Lewis	723 Market St.
Peerless M Co.	Arizona	5	Feb 13	Mar 20	Apr 12	W. O. Lewis	723 Market St.
Potosi M Co.	Nevada	34	Feb 13	Mar 20	Apr 12	W. O. Lewis	723 Market St.
Quaker G M Co.	California	13	Feb 13	Mar 20	Apr 12	W. O. Lewis	723 Market St.
Standard Cons. M Co.	California	2	Feb 13	Mar 20	Apr 12	W. O. Lewis	723 Market St.
Union Cons M Co.	Nevada	40	Feb 13	Mar 20	Apr 12	W. O. Lewis	723 Market St.
Utah Cons M Co.	Nevada	9	Feb 13	Mar 20	Apr 12	W. O. Lewis	723 Market St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Bailey Cons M Co.	California	L. Osborn	309 Montgomery St.	Annual	Apr 9
California Iron & Steel Co.	California	F. Bonadina	433 California St.	Annual	Apr 21
Carlson Coal Co.	California	E. G. Knapp	307 California St.	Annual	Apr 1
Coos Bay, Oregon, Coal Co.	California	W. V. Huntington	Fourth and Townsend Sts.	Annual	Apr 9
Live Oak Drift Gravel Co.	California	J. Morizio	328 Montgomery St.	Annual	Apr 15
Russell Reduction & M Co.	California	J. Morizio	328 Montgomery St.	Annual	Apr 21

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Champion M Co.	Nevada	T. Wetzel	522 Montgomery St.	10	Jan 20
Caledonia M Co.	Nevada	A. S. Cushman	323 Montgomery St.	08	Apr 1
Con California & Va M Co.	Nevada	A. W. Havens	300 Montgomery St.	25	Feb 10
Derbec Blue Gravel M Co.	California	T. Wetzel	622 Montgomery St.	10	Dec 23
Idaho M Co.	California	—	Grass Valley	2 50	Mar 7
Mt Diablo M Co.	Nevada	R. Heath	319 Pine St.	30	Oct 23
Pacific Borax Salt & Soda Co.	California	A. H. Clough	230 Montgomery St.	1 00	Feb 10

Mining Share Market.

The past week has witnessed more general activity in the Comstock mining shares than since April of 1889. The activity has a far different appearance from that of a year ago, for seemingly it has the elements of a market based on important work in the mines and stocks being well concentrated. The leaders the past week were Coblar and Potosi, which made a decided advance, causing many shorts to fill, after which, under manipulation, a bear raid was made, sending the prices down from 20 to 35 per cent; but toward the close of the informal session this morning the market gave signs of turning for the better. In the outside stocks there was very little done; the attention of the public is drawn to the Comstocks.

Opbir was assessed 50 cents a share the past week, while Con. Virginia declared a dividend of 25 cents per share.

The street is filled with rumors of all kinds—made to fit any particular case.

The most important information received this week from Virginia City is that an agreement has been arrived at for reducing the water charges, transportation charges, Suto tunnel royalty and milling. The general reduction averages about 50 per cent.

From the Comstock mines, reliable private advices continue hard to get, but all to hand are confirmatory of previously received information. In the upraise in Potosi the ledge is about five feet wide, and assays from \$40 to \$70 per ton, although about half of it goes much higher. The winze is being sunk on ore that assays well. Mr. Lyman and W. E. Sbaron, after examining the Potosi and Coblar mines, speak very bigbly of the outlook. The general tenor of their reports is that an important ore body is liable to be uncovered with further work in the two mines. They confirm what has previously appeared in the columns of the MINING AND SCIENTIFIC PRESS.

While attention is drawn to the middle mines, it is well not to overlook the fact that very important work is going on in the North End and Gold Hill mines, which will undoubtedly lead to more general activity in the stocks of these mines. Opbir, Mexican, Union, Sierra Nevada and Utah deserve watching in the North End, as do Overman, Sag. B-lcher, Belcher, Crown Point, Yellow Jacket and Confidence at the South End.

In Alpha and Con. Imperial, good work is being done. The official letter received yesterday (Wednesday) from Overman, reports that in the incline upraise from the 54-foot level they were in 11 feet of ore that assays from \$22 to \$25 a ton. In Crown Point an improvement is reported in the upraise above the 300-foot level, while in the winz below that level they are in one set of timber of good ore (good ore assays from \$30 to \$45 a ton). In Confidence the west crosscut is reported in low-grade ore.

In reply to a subscriber, we will state that Crown Point milled in last month (March) 3500 tons of ore which averaged fully \$17.50 per ton, pulp assay, or a total of \$61,250. This, when reduced to bullion and sold, should give to the company a coin return for the month of not less than \$45,000, and may go over \$50,000. This ought to pay all running expenses, indebtedness, and leave a surplus. The full returns will not come to band until after the statement of April 1st.

A NEW SYSTEM FOR HANGING ELECTRIC WIRES over the streets is proposed by a Milwaukee electrician. A wrought-iron arch will span the street between a wary pair of poles to keep them from curving or breaking, and to prevent the wire from sagging. The orac-wirra will be supported by two properly insulated wires suspended from the arch. Gnard wires will be hung from the arches parallel with and above the traction wires, so that if a telegraph wire happens to break it will not fall on the heavily charged wires.

THE DURABILITY OF YELLOW PINE for flooring, says the Northwest Lumberman, is shown by an instance in which a saw-manufacturing concern five years ago put a long-laaf pine floor in its factory, which is as sound now as when put down, the manager of the concern declaring that if white pine had been used it would not have lasted more than a year on account of the war of constant rolling saws over it, the teeth cutting into the soft wood.

A MULTIPLE COLOR PRESS is successfully used which will print a daily newspaper in a dozen different colors at the rate of 30,000 copies an hour.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING MAR. 13.	WEEK ENDING MAR. 20.	WEEK ENDING MAR. 27.	WEEK ENDING APR. 3.
Alpa.	.90	.95	.85	1.101.00
Andes.	1.20	1.15	1.20	1.151.20
Belcher.	.45	.50	.49	.50
Best & Belcher.	1.40	1.701.45	1.601.40	1.801.05
Bullion.	2.55	2.752.50	2.602.50	2.803.00
Bulwer.	.50	.60	.50	.50
Bodie Con.	.45	.50	.45	.50
Commonwealth.	.20	.15	.20	.20
Con. Va. & Cal.	3.25	3.552.55	2.852.50	2.852.60
Challenge.	2.80	3.552.55	2.852.60	2.80
Chollar.	4.25	4.501.45	4.501.45	4.454.40
Confidence.	1.30	1.351.25	1.15	1.401.60
Con. Imperial.	2.00	2.302.00	2.252.10	2.403.30
Caledonia.	2.90	3.252.90	3.15	2.802.90
Crown Point.	.30	.40	.30	.40
Crocker.	3.40	4.00	3.35	4.40
Del Monte.	.20	.15	.20	.25
Eschsch.	1.50	1.601.50	1.601.50	1.952.05
Eschsch.	.30	.30	.35	.35
Grand Prize.	.85	1.20	.90	1.05
Gould & Curry.	3.75	3.50	3.50	3.50
Hale & Norcross.	.45	.50	.45	.50
Justice.	.60	.65	.60	.65
Justine.	1.20	1.401.30	1.351.25	1.501.60
Kentuck.	2.30	2.402.35	2.452.35	2.802.65
Lady Wash.	.20	.20	.35	.40
Mono.	1.30	1.401.25	1.30	1.35
Navajo.	.70	.75	.75	1.00
North Belle Isle.	.30	.30	.30	.25
New Queen.	.25	.30	.30	.35
Occidental.	2.85	3.252.85	3.102.85	3.203.25
Overman.	25	30	25	30
Potosi.	1.00	1.251.00	1.051.20	1.301.10
Peerless.	.60	.70	.75	.60
Perr.	.90	.90	.75	.60
S. B. & M.	3.60	4.153.75	3.953.70	4.104.15
Silver Hill.	.95	1.05.85	.95	1.051.10
Scorpion.	1.70	1.851.80	2.002.00	3.804.45
Utah.	.20	.20	.15	.20
Yellow Jacket.	1.45	1.601.45	1.551.50	1.801.85
	1.25	1.501.25	1.351.00	1.501.35
	2.05	2.252.00	2.102.00	2.402.30
	.30	.30	.30	.35
	2.10	2.351.95	2.202.10	2.302.25
	.45	.55	.45	.50
	1.90	1.951.90	2.001.90	2.052.20

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

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H. KELLEY—Modoc Co.
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It is marvelous that the cyclone killed only 100 people in Louisville. Such storms have been more fatal than that in the open country. The city is to be congratulated upon its escape.

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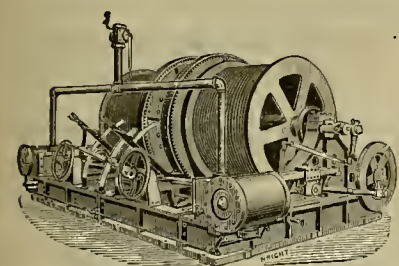
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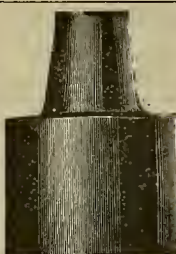
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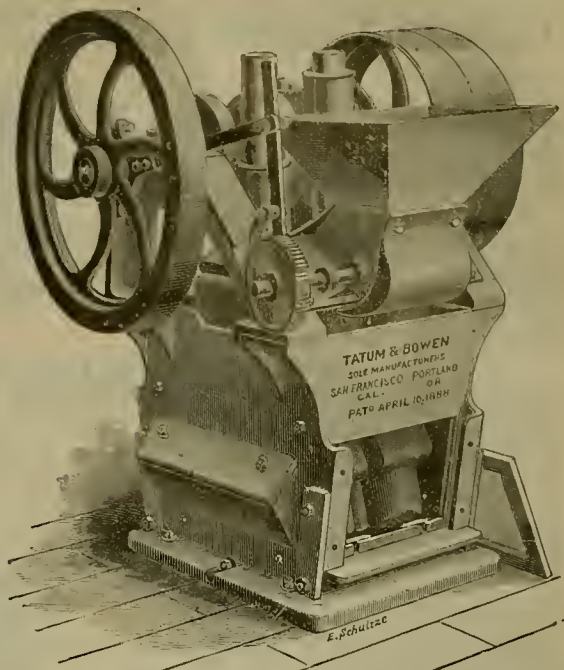
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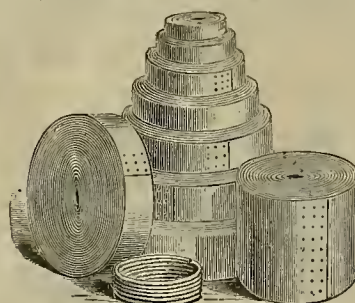
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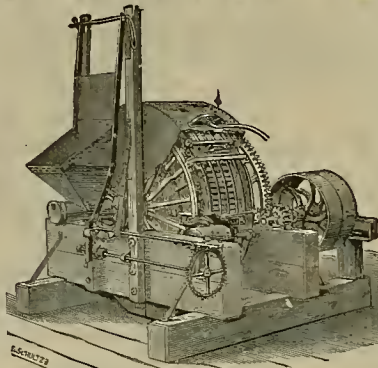
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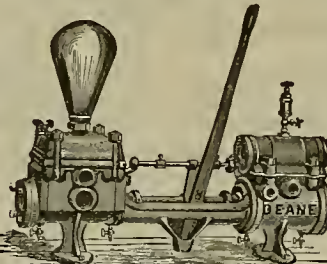
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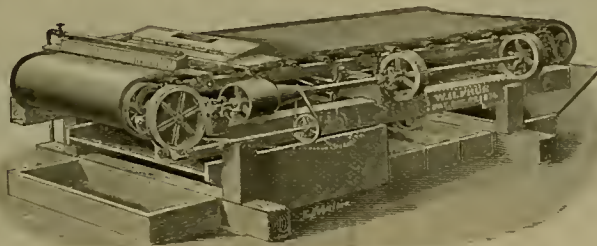
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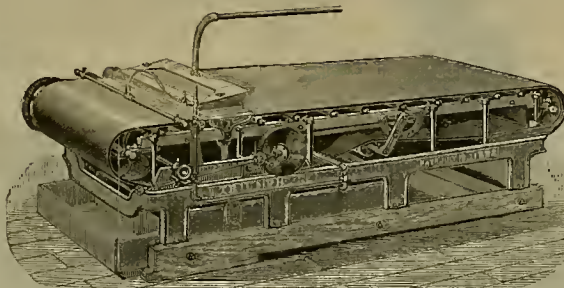
N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 41 additional Frues and more stamps have been purchased. ADAMS & CARTER.

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Location of Works, Grass Valley, Nevada Co., Cal.
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GENTLEMEN—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.

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(Signed) Sup't North Star and Original Empire Mining Co.
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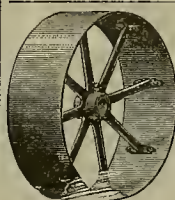
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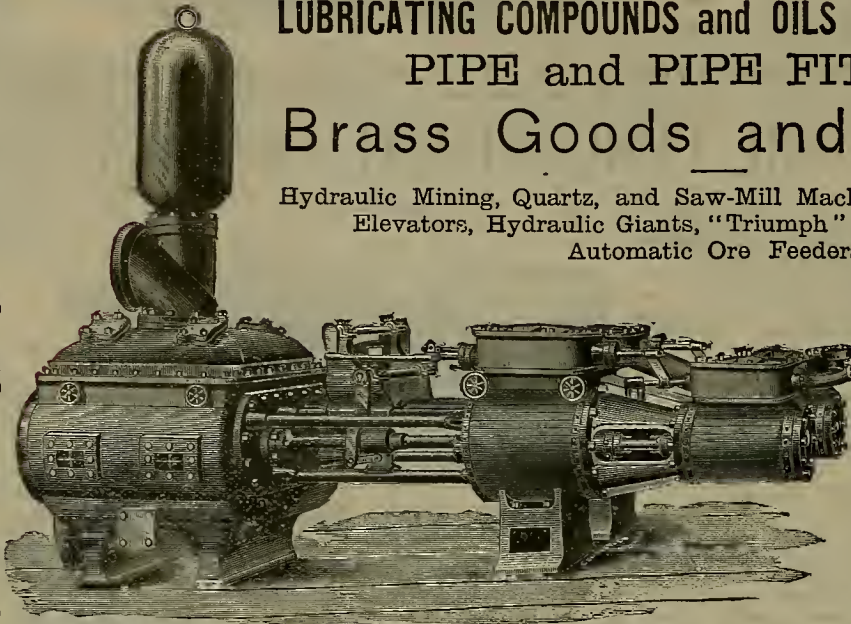
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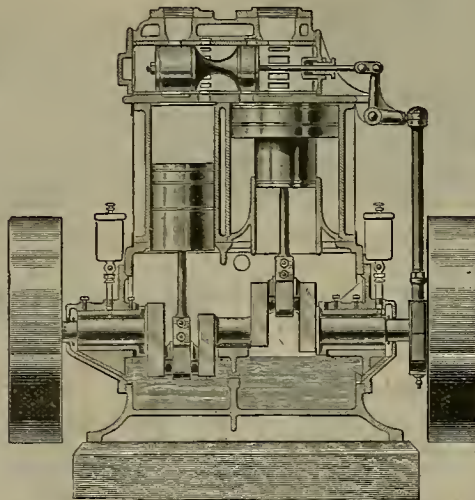
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DEWEY & CO., PUBLISHERS.

SAN FRANCISCO, SATURDAY, APRIL 12, 1890.

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Rolls For Working Ore.

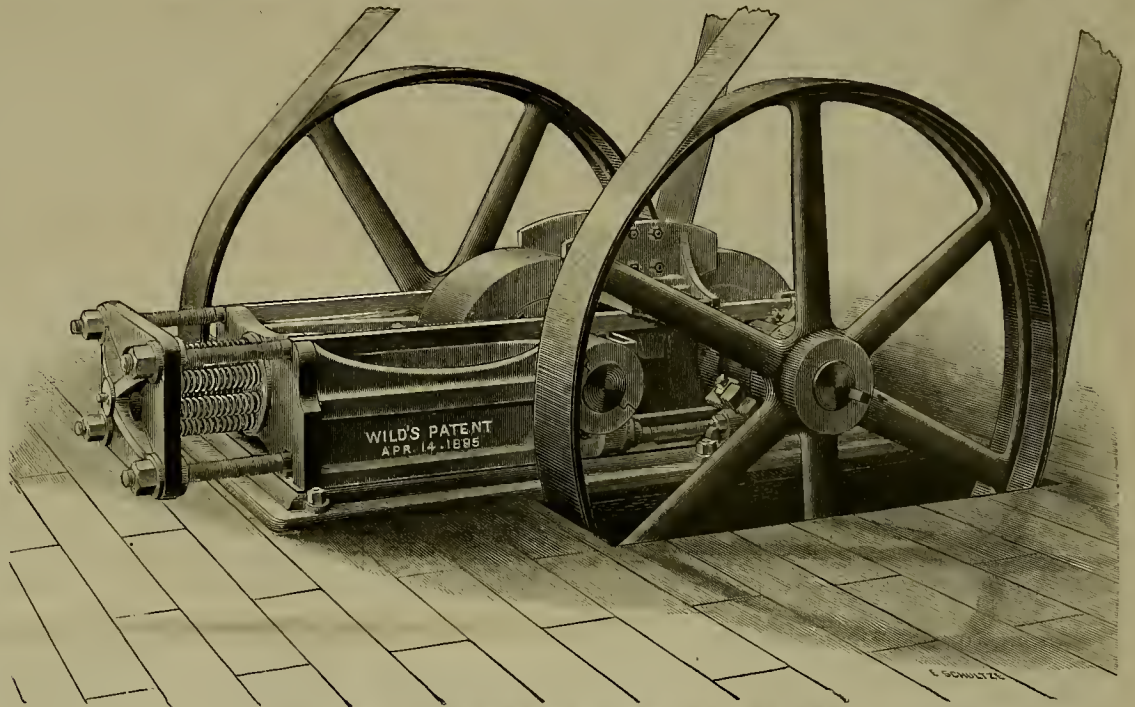
For concentrating ores for subsequent metallurgical treatment, the crushing, to avoid comminution, which produces slimes, the ores must be disintegrated only to the extent requisite to unlock all the minerals. The coarse crushing of the ore is effected by rock-breakers, two sometimes being used, the second crushing finer than the first. The screenings from the rock-breakers are further comminuted by rolls, which, for this purpose, are preferable to stamps, inasmuch as their use minimizes the amount of slimes incidental to crushing. The degree of the fineness of the crushing will depend on the character of the ore and the system of treatment adopted. There are two sets of rolls—the coarse-crushing rolls and the fine-crushing or “finishing” rolls. The types furnished by the Union Iron Works of this city for concentrating-mills are shown in the accompanying engravings.

The roughing rolls are geared up to get the power for crushing the coarser parts of the rock after it has passed through the rock-breaker. One of the rolls with its gear and pinion is carried on a sliding frame held in position by spiral springs, which in turn press against the cross-head, which is supported by the four heavy bolts that pass over to the opposite roll. The springs allow for any irregularity or hard rock that may get into them. The rolls themselves are supplied with white iron shells held in place by means of a key so they may easily be replaced—or of steel.

All ore that is too coarse to pass through the screen in trommel No. 1 is put through the finishing roll, which reduces it in size sufficiently to pass through the first trommel. Like the roughing roll, one roll is carried on a sliding frame supported at the back by the steel spiral springs as shown resting against the cross-head, and all supported by the four bolts. The rolls have steel shells faced and fitted to place, held by an inside key as in the roughing rolls. There

is a cast-iron hopper with a screen in the top which only admits ore at a certain degree of fineness.

THE PLACER MINES OF MONTANA yielded last year \$285,451, divided between the several counties as follows: Deer Lodge, \$94,930; Jefferson, \$79,421; Madison, \$4100; Meagher, \$58,000; Silver Bow, \$50,000. The average wages paid for work in this industry are \$3.42 per day.



WILD'S PATENT FINISHING ROLLS FOR FINE ORE.

A Novel Application of Water-Power.

One of the best examples of the utilization of waste water that has come under our notice is that recently made at Watsonville, Santa Cruz county, in this State. The Corralitos Water Company get their supply from the Corralitos Creek at a point $7\frac{1}{2}$ miles from the town. Their distributing reservoir is located $1\frac{1}{2}$ miles distant at an elevation of 90 feet. The water is brought from the Corralitos creek, six miles above, in a

15-inch pipe and discharges into the reservoir under a considerable head.

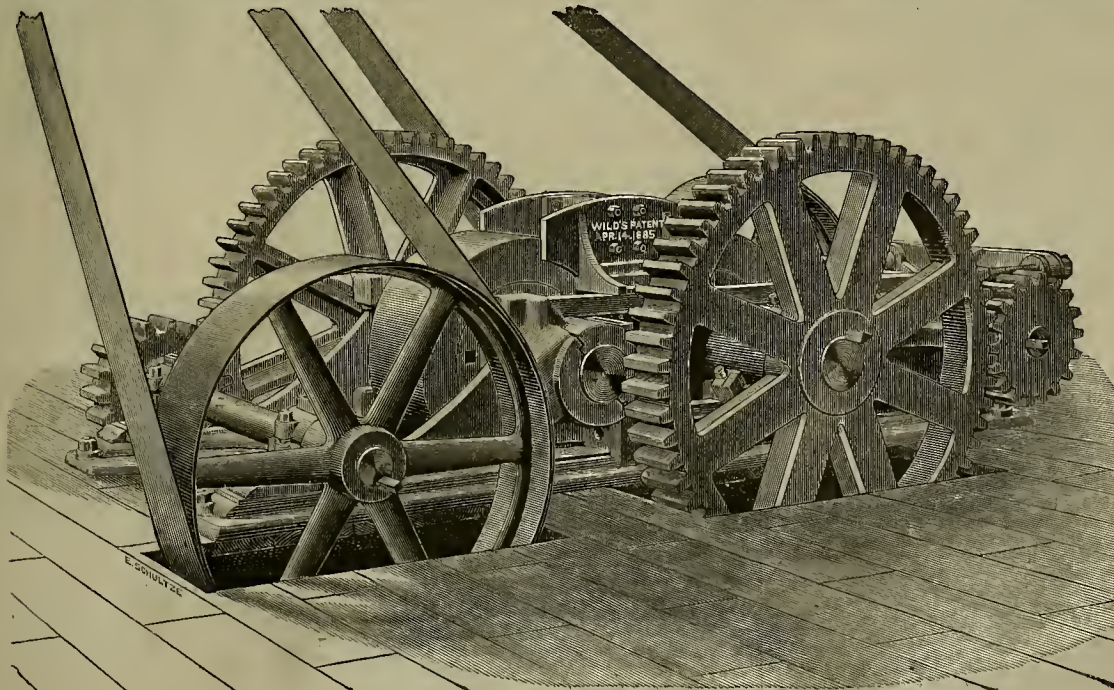
It occurred to the Water Company not long ago that this pressure might be utilized to light the town, and after conference with the Pelton Water Wheel Co., the scheme was found to be perfectly practicable, and a contract was at once entered into with that company to erect the power plant, and with the Thomson-Houston Co. for the electric installation.

The plant consists of a 4-foot Pelton wheel, which runs under a pressure of 60 pounds, equal to a head of 140 feet, the water being discharged on to the wheel through a $2\frac{1}{4}$ inch nozzle. Close regulation is afforded by a deflecting nozzles and hydraulic governor, which gives perfect steadiness to the lights. The dynamo is a T. & H. alternating current which runs 300 16 C. P. incandescent lights, the current being carried to the town, $1\frac{1}{2}$ miles distant.

The power thus furnished, it will be seen, is from the waste water that has been absolutely valueless, and is so much clear gain to the company, the cost of operating the plant being almost nominal. The water after leaving the wheels falls into the reservoir, having been aerated and freshened to as great an extent as though it had been dashed over a cataract, thus incidentally accomplishing without expense what is so much needed in such cases.

This plant has been in successful operation some three months, and it is now proposed to put in an ice-machine and thus utilize the power wasted during the day. There are probably hundreds of places all over the country where this same experiment can be repeated with corresponding results.

A REAL mining boom is reported at Pioche. In five years nineteen millions of dollars were taken out of the mines. Recently the property has passed into other hands, and the new owners are reopening the mines with good prospects.



WILD'S ROUGHING ROLLS FOR ORE.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—*Eds.*

Angels, Calaveras County.

A Description of the Caved Mine.

[From Our Own Correspondent.]

Angels, like all other mining camps in the State, has seen the loser this winter in the battle with the elements. At the present time an excess of water in the workings and the next to impassable condition of the roads, has caused the most of the mines to close down. Once the weather becomes settled, operations will be resumed on a more extensive scale than in the past season; large mills and additional chlorination works will be erected, and Angels continue to forge ahead.

The Utica.

This mine is the property of Messrs. Hayward, Hobart & Lane, with Mr. C. D. Lane as superintendent, and Mr. C. A. Lillie foreman. Messrs. Lane & Lillie are both old and practical miners. The fine 60 stamp mill with its 24 fine concentrators, the hoists, complete chlorination works, water-power, air-compressors, power-drills, sawmill, and everything in and about the property, show the ability of the managers. The vein is large (25 to 30 feet) and the mine may be called a low-grade proposition, worked on a necessarily large scale. The stamp-mill is crushing $3\frac{1}{2}$ tons per stamp every 24 hours, or 200 tons per day. By reason of the large amount of ore handled and the economy in operating, the mine is a paying property. At the present time the north shaft is used. This has a perpendicular depth of 530 feet. The ore is conveyed from the 200 and 300-foot levels. Eighty to 100 men are in the company's employ, with wages from \$2.50 to \$3 per day.

The Cave.

The cave, by which 17 men lost their lives, has been the subject of a great amount of criticism. In consequence, I asked Mr. Lane for a correct version of the sad affair, and was referred to the Coroner's verdict and requested to go through the mine and inspect the scene of the accident. Stepping on to the bucket, my companion, who was one of the miners that escaped at the time of the accident, signaled the engineer and we were soon at the 330-foot level. Walking through the crescent in the tunnel driven through the country rock, we came to the place of the accident. The vein at this point is about 30 feet wide. A drift has been run through on one wall, leaving the cave on the opposite side. Once this drift is securely timbered and the miners made perfectly safe, the caved matter will be taken out and the bodies of the unfortunate miners, still hurried in this mass, removed. One set of miners is cautiously working in from the north face and occasionally finding a body, crushed and ground by the great weight of this mass of rock and timbers. Nothing short of a personal inspection could give any idea of the great force exerted by the mass of matter once it started. Huge timbers 24 inches in diameter are snapped asunder as though they had been but straws. Timbers lie in every position, crushed, broken and piled over and through each other, like a log-jam on the rivers of a timber region. Strange as it may seem, the cave is but 60 feet in length. The country beyond, at both sides, remains solid. Everything shows that once the cave started, no system of mine-timbering could have withstood the great and sudden strain of this mass of rock, thoroughly saturated with water.

The History of the Cave.

The surface ore of the Utica had been worked out in the early days by Senator Fair; others following, worked still deeper, leaving the vein open to the surface. Mr. Lane had filled this open space in with waste from the mine, but as the level of this surface was some 20 feet below the hillside, it caught a large amount of water and in the unusual storms of this season the whole country was filled to the surface with water. From the 330-foot level an upraise or stope had been carried up 80 feet. The space excavated was timbered with 20-inch timbers arranged in sets, with five feet from center to center. Mr. Hayward had placed his old timbermen on the Plymouth, Mr. Geo. Williams in charge as hose timberman. Mr. Williams, by reason of his ability, age and the confidence reposed in him, was given entire charge of all the timbering in the mine. While he discussed the way in which he proposed timbering with the mine foreman and superintendent, they did not direct or dictate in any way to him. The ground had become heavy with its load of water, and the timbers showed that they were springing—not an unusual occurrence, as every mining man knows. The day before the cave, Mr. Williams asked Mr. Lane to go down into the mine and inspect it. Messrs. Lane, Williams & Lillie stood where the cave now is for over a half-hour. Mr. Williams speaking of his work and expressing the opinion that he had the mine well timbered. Mr. Lane replied: "Don't worry about its caving. If it caves you shan't be blamed in any way. Take all the men and timbers you want, only don't take any chances, for I would rather see the whole mine cave than any of the boys get hurt." To this Mr. Williams replied: "There is no danger. It can't come, the way I have it timbered, without giving us all the time we want to get out."

Mr. Lillie suggested to Mr. Williams that as the mill was full of ore, they lay their men off the following day—Sunday—and not work the mine and reduce expense to that amount. Mr. Williams replied that as the mine showed signs of springing, he would do some work to make it secure.

At the time of the accident 20 men were employed at this point. One of the men started out for a shovel and two more were at the outer ledge, when, suddenly and without the slightest warning, the roof dropped like a veritable deadfall, and 17 men, in an instant, were killed as suddenly as though executed by electricity. The excited imagination of some of the towns-people caused them to assert that the voices of miners could be heard on the 140 foot level. The Sept. went all through this level, which was then intact without finding any men. Scarcely had he reached the surface when the mine caved from the surface down. Mr. Williams was not then, nor is his memory now, charged with carelessness or ignorance. The cave was like that of the old Dead Horse of Tuolumne county, the Golden Tera of Dakota and many others where the overhanging matter suddenly breaks loose and crushes everything beneath it by its overwhelming force. The all-wise critics would make it appear that the mine-owners were benefited, and even innuendo that they had planned this great loss of life and money. If there is any one more than another anxious to prevent such catastrophes, it is the superintendent and mine-owners, as an accident of that kind means not only a loss in life but one of money as well. I went out of my way to investigate some of the criticisms that have been published. I find that Mrs. Williams says now that "Mr. Williams left that morning for his work just as he always did. He said nothing of any fear of a cave." Rumor has it that their parting on that fatal morning was of a death-bed character, Mrs. Williams pleading with her husband to not go, and he with pale face and set teeth declaring with a parting kiss that he must go, as his reputation was at stake. The statement that Mr. Lillie refused to go into the mine or let his men work for fear of the cave was misconstrued from his request to Williams that they lay the men off over Sunday. The most infamous remark, attributed to Mr. Lane, that "men were cheaper than timbers," shows the desperation of these jackals. No one who knows Mr. Lane—an old miner himself—who has gone through the works and seen the cordial relations and good-fellowship existing between Mr. Lane and all his employees, could for a moment believe a lie so infamous.

Angels, like all mining towns, has a class of hard-core miners who would not work if it were given them to do, but because they are not given positions of trust, for which they are in every way unfitted, set upon every successful man and endeavor, by false charges and cunningly misconstrued facts, to blacken his character and injure the property in his charge.

The Lane and Tullock Mine.

"Uncle Jimmy" Tullock is pounding away with his five stamps and making his ore-concentrator save all the sulphurets from the five stamps, and at the same time handled a large amount of dirty concentrates from another mill, thus giving the whole the work of 40 stamps, which it does easily. The mining industry owes the self-feeding principle of the present ore-feeders to "Uncle Jimmy," and the Tullock ore concentrator in capacity, efficiency and cheapness promises to make the concentration of all ores so cheap that they will be universally adopted.

The Gold Cliff.

This mine is still being worked under bond by Messrs. Hayward & Hobart. Rumor has it that the property is satisfactory.

Dry Crushing.

Mr. Chas. D. Smith has his dry mill in operation, and at this time it is running on concentrates from the Hale mine. These concentrates, after passing through the usual battery and plate milling, give by assay \$60 a ton. Mr. Bacon, of Mr. Smith's company, sampled the concentrates and the tailings, after they had been treated in Mr. Smith's mill, and sent both to Wiegand & Co. of Virginia City, Nev., for assay. Their certificate shows—"value of concentrates, \$60; value of tailings, \$2.06." Mr. Smith is not really very much pleased with this success, but contemplates the perfecting of an entirely new system, which he thinks will excel any other process. Mr. Smith is a firm believer in the dry process for gold ore, and "don't want any stamps in his." A part of Mr. Smith's process has been illustrated in the MINING AND SCIENTIFIC PRESS. The mill is simple and free from dust, a rare and desirable condition where dry crushing is followed. The ores are crushed dry to a fineness of 100-mesh in a pulverizer similar in construction to the Jenich mill, illustrated in the PRESS of June 29, 1889. From this the ore passes to a revolving amalgamating hand from which it is discharged into a scouring and amalgamating pan, the discharge flowing over Mr. Smith's shaking table and on to amalgamating plates.

For concentrates or high-grade ore, I think the mill will do all that Mr. Smith claims for it, but I do not see how it is possible for this or any other dry-crushing process to work the average ore to a profit. I don't question the possibility of saving \$58.94 out of \$60 concentrates that the battery and plate has failed to save, but I claim that these slow and expensive processes are best fitted for the treat-

ment of very high-grade rebellious ores or the concentrates from the old-fashioned dividend-providing stamp-mills. I was told, in Angels, that my article on "Gold Hath a Place where They Fine It" was aimed at a man in that vicinity, to which I replied that that class of men were a part of all mining history and were to be found at all times and in all places; that it was but natural that each one should think himself the party referred to, like the colored preacher who remarked to his congregation: "Dere is a pussen in dis ohnch wat steals chickens, and I'm gwine to frow die hible at his hed." Immediately, every dorky's head ducked. E. H. SCHAEFFLE.

Murphy, Cal.

The Mining Outlook in Honduras.

EDITORS PRESS:—I have been so busy with the affairs of the company which sent me down here that I have had little opportunity of informing myself of what was going on in other camps; however, I can say that the mining outlook in Honduras is brighter now than ever before in recent times, and a couple of years more will perhaps prove that the Spaniards did not carry off the highest end of her treasures.

The Rosairo Co.'s mill is to be started again very soon, I believe, with plenty of ore. It has 30 stamps. The Victoria, in Curaren, with ten stamps, is doing well and has recently developed a fine vein of silver glance in quartz. This is one of the mines which were examined in '87 for Senator Hearst, I being assayer to the party. At that time it was a mere prospect, but has developed well. Smelting in Angels valley, Department of Tegucigalpa, has been carried on in the small furnaces of the country with such success that the company has decided on sending castings for a blast furnace on the modern plan. The ore contains much blende, which is partly gotten rid of by roasting. In the Department of Olancha a rich strike in gold quartz is reported and an English syndicate is tackling the river-beds again. In Choluteca some apparently good gold mines are being opened by the Dos Hermanos Co., the superintendent, Mr. Patrick O'Hara, very sensibly resisting all temptation to put up works until he can be sure of plenty of good ore. The Victoria Co., $1\frac{1}{2}$ miles north of this place, has a large concession with plenty of veins carrying gold or silver, or both, but not sufficiently opened yet to determine their value. A mill is in course of erection with a capacity for 15 tons per day, the machinery being mostly of new design and invention. I can form but little opinion as to its value.

The mines of the Santa Lucia Co., nine miles from Tegucigalpa, are reputed to be the best, or among the best, in this department. The company has expended somewhere near \$200,000, but, owing to the circumstances on which it is not necessary here to dilate, but which are well understood here and now at the company's headquarters, no profit has been made so far. The ores had, up to about six months ago, the reputation of being "too refractory to be worked," but *nous avons change tout cela*, and proved that when they can be extracted in sufficient quantity to keep the mill occupied, they can be worked with profit even with the present "rather inefficient plant."

The mill has been stopped ever since November 19 last year, and work has been carried on in the mine (for only one of the many veins is worked) with such success that I shall be surprised if the mill should not be in operation again within six months.

The management of these mines is now eminently sensible and economical, and if so continued, the property must soon be on a paying basis. A great deal has been done, and much still remains to be done, to retrieve the errors of the former management, both in mine and mill, and unfortunately the distrust produced by needless failures and difficulties which might have been avoided have hampered the financial resources of the company to some extent, though its business honor has been kept stainless throughout. I consider the success of this company as a foregone conclusion, provided the present discreet course, with a little more vigor thrown in, shall be maintained; but a relapse into the follies of the past will insure ruin unless something shall be found in the mines which their record, though good, does not warrant the hope of. That is a really "big bonanza," as we understand it in California.

Exchange on New York is now selling at 35 to 40 per cent premium for 60 days sight. Exchange on San Francisco is rarely obtainable, though occasionally called for. United States gold commands a premium of 40 per cent in small lots required by travelers.

There is but one hotel in the capital city, Tegucigalpa; it is subsidized by the Government, notwithstanding, or perhaps in consequence of which it is a poor affair, though charging \$2.50 H. C. per day to transient customers, 25 cents for a glass of wine, liquor, etc., and 50 cents for a half bottle of warm beer. It seems to do a good business. Fleas are the most abundant game in the country, but the experienced traveler who has a cot or hammock to sleep in need not dread them. The ceremony of going to bed is a simpler affair here than with us, and though I do not know exactly how it is conducted among the so-called better class, I am aware that the common

people frequently or usually retire in a state of absolute nudity to their not too luxurious couches. There is a reason for this; the fleas, if not confined within a night-dress, may bite, but they don't *tickle*, which latter is to most people by far the more annoying. The worst practice is that of many men, and especially of travelers, sleeping, or trying to, in their underclothes.

It is a good plan to carry a stock of insect powder, which is effective against not only fleas but other vermin as well. Finally, and generally it is sufficient before retiring to shake all sheets and blankets at a little distance from the bed, and the same with whatever night-clothing is to be worn, if any; then strip completely away from the bed, leaving any fleas that may be about the person in the clothing till morning. To avoid *niquas*, usually known as jiggers in the feet, never put the bare foot to the ground or floor. In the rainy season a poncho is requisite; it is the only thing that is fit for a rider in the rain; it should be accompanied by a rubber hood or a "sou'wester." A hammock or a folding cot is very necessary. Arms are scarcely needed, though most travelers carry a revolver. The common people may be petty thieves, not highwaymen nor burglars, often. A man who remains long in the country should own a good riding mule and saddle. Even at this season of the year we have occasional showers, though the air seems dry enough and the roads are dusty. C. H. A.

Santa Lucia, Honduras.

IRON UNDER SHOCK.—British experts have been comparing notes concerning the change in the internal structure of iron under shock. One said that vibration made malleable crane chains resemble cast iron. Another thought that cold hammering axles to give high polish changes their internal structure, and his recommends finishing them at high temperature as a preventive. A Mr. Glynn thinks both cast and wrought iron are altered by successive blows—the wrought crystallized, and the crystals of the cast iron are enlarged. But another, Mr. Stephenson, cited the case of an engine connecting-rod that had vibrated 25,000,000 times and yet was perfectly fibrous. Axles that have been thought to have changed may not have been fibrous at first, for, although when a piece of iron is rolled out from a length of one foot to one of twenty feet, it must become fibrous, it does not necessarily do so when it is only drawn out from one foot to six feet. Another remarked that the change from crank-axes to the present straight form has diminished breakage. Mr. Bounel doubts any real change of internal structure and thinks that the differing results in tested specimens are quite likely to have resulted from difference in the kind of blow causing the fracture. For example, the same piece of iron may be made to show a fibrous texture by a slow, heavy blow, and a crystalline when the blow is sharp and quick. So, too, temperature may cause a difference, cold iron showing a more crystalline fracture than the same iron when somewhat warm.—*Boston Jour. of Com.*

A DYNAMITE MAGAZINE FOR HOT COUNTRIES is illustrated in *Indian Engineering* for Feb. 8th. It is designed for use in India by Mr. John Harris, dynamite instructor to the Nobel's Explosive Co. It is a brick structure 13x24 feet on plan, 15 feet high, with an arched roof 15 inches thick, and a 6-inch cement floor. The walls of the building are 18 inches thick, with but one end window and one door opening into a vestibule 10x16½ feet in plan. The boxes of dynamite are piled on oak-wood benches. On two sides of the building are two tiers, of three each, of ventilators 8 inches square, and covered with an iron grating. To prevent any mischief being done through these ventilators, they are Z-shaped in the section of the wall, the opening inside being nearly three feet above the outside opening. A lightning-rod at each end of the building terminates in a 3x3 feet $\frac{1}{2}$ inch copper ground-plate. The doors and the one shutter are made of $\frac{1}{2}$ -inch wrought iron with iron frames, so that the building is absolutely fireproof.

A GOOD IDEA.—In Paris, whenever a local shopkeeper advertises to sell "at cost," a government official, detailed for the purpose, swoops down upon him and makes a careful inspection, in order to satisfy himself that the merchant carries out what he advertises. If the latter is detected in fraud, an adequate punishment is at once meted out to him. They don't deny a man's right to sell his goods at less than cost if he chooses, but he must not publish any lying advertisement.

WEAVING GLASS.—In the new process for spinning and weaving glass into cloth, the warp is composed of silk forming the body and groundwork, on which the pattern in glass appears. Not less than 50 to 60 of the original glass strands are required to form one thread of the web, and not more than a yard of the cloth can be produced in 12 hours.

THERE are now over 60 specially built or converted steamers running on the Atlantic and Mediterranean for conveying petroleum in bulk, known as "tank" vessels, and it is estimated that they take four-fifths of the entire trade.

THE three-hundredth anniversary of the invention of the microscope is to be celebrated in Antwerp this year.

The Deep Gold Placers of California.

NUMBER II.

[Written for the Press and Copyrighted 1890, by HENRY G. HANES, F. G. S. A., F. G. S.]

Geography of the Deep Placers and Other Mining Regions of California.

The great mountain chain of California extends from the extreme north to the southern line of the State. The eastern slope is abrupt, while the western is a wide inclined plain. On this side most of the known gold deposits lie.

The placers, deep and shallow, primary and secondary, occupy a series of plateaus beginning at sea level and attaining an altitude of 6000 feet.

Individual peaks of unusual height rise to an altitude exceeding 14,000 feet, many far above the known auriferous basins or channels.

These elevated plateaus and mountain slopes are eroded with deep and precipitous gorges known on the Pacific Coast as "canyons," a word from the Spanish meaning a tube or pipe.

While the gold region extends from Siskiyou to San Diego, the principal mines lie in Plumas, Sierra, Placer, Nevada and Yuba counties, a country drained by the Feather, Yuba and Bear rivers. At least 300 hydraulic and drift mines were at one time in active operation on this area, not to mention a multitude of lesser placer washings conducted by small companies and individuals.

The true geology of California is not known. All geological coloring of the high placers is the merest guesswork; rocks seemingly sedimentary are so metamorphic that they are singularly devoid of animal and vegetable remains, although if more carefully studied, fossils might be found. In some cases a few have been accidentally discovered by prospectors, as, for example, near Cerro Gordo in Inyo county, and in Talare and San Diego counties, which limited localities are thus proven to be carboniferous.

California has been sadly remiss in not giving more attention to geological surveys of the State; we do not generally recognize the importance of information gained by miners, prospectors and a few local geologists, whose discoveries and investigations are not published because of a strange apathy on the part of those most interested, the people themselves. There are many learned men in other parts of the world who look eagerly to California for information of which they receive but little. The high placer mines of California cover but a limited area compared with that of the State. With a radius of 40 miles and with Downsville as a center, a circle may be described on the State map which will include nearly all the noted placers in the region early known as the "northern mines," from which the main part of the placer gold was gathered. Such a circle would cover an area of 5026 square miles, and would include portions of Butte, El Dorado, Nevada, Placer, Plumas, Sierra and Yuba counties.

The southern mines, which could be included within a similar circle, with Jackson, Amador county, for a center, lie at a lower altitude. They are generally of the hydraulic or shallow placer character. Portions of the following counties would be embraced within this second golden circle: Alpine, Amador, Calaveras, El Dorado, Sacramento, San Joaquin, Stanislaus and Tuolumne.

Both north and south of these mines, extending to the State lines, gold and silver are found, but the country has not been thoroughly explored, and in consequence is not so well known. There seems to be no reason why other quite as extensive deep placers may not be found when proper search is made for them. It is my opinion that every lava-capped ridge within a radius of 20 miles around Pilot Peak is underlain by a bed of gravel more or less auriferous, which may be reached by driving tunnels. The amount of gold already taken from this circle can be proved to be many millions of dollars.

RELATIVE ALTITUDES ABOVE SEA LEVEL OF THE DEEP PLACERS OF CALIFORNIA, INCLUDING A FEW MOUNTAIN LAKES AND SUMMITS.

	Feet.
Auburn, Placer Co.	1,176
Cherokee Flat, Butte Co.	1,187
Chinese Camp, Calaveras Co.	1,374
Tuttle-town, Tuolumne Co.	1,381
Posters Bar, Yuba Co.	1,391
Kincaid Flat, Tuolumne Co.	1,589
American mine, Nevada Co.	1,843
Volcan and Ready, Nevada Co.	2,000
Reich, Amador Co.	2,076
Dardanelles mine (bedrock) Placer Co.	2,077
Placerville, Calaveras Co.	2,109
Columbia, Tuolumne Co.	2,157
Spanish Dry Diggings, El Dorado Co.	2,158
You B. T. Nev. Co.	2,172
Grass Valley, Nevada Co.	2,454
Forbestown, Butte Co.	2,625
Todd's Mount, Placer Co.	2,750
Alta City, Nevada Co.	2,800
Downsville, Sierra Co.	2,806
Big Oak Flat, Tuolumne Co.	2,823
Little York, Nevada Co.	2,830
Iowa Hill, Placer Co.	2,873
Wisconsin Hill, Placer Co.	2,936
Blue Tent, Nevada Co.	3,108
Forest Hill, Nevada Co.	3,173
Forest Hill, Placer Co.	3,237
Quaker Hill, Nevada Co.	3,265
North Bloomfield, Nevada Co.	3,278
Dutch Flat, Nevada Co.	3,395
Quincy, Plumas Co.	3,416
Greenville, Plumas Co.	3,544
Brandy City, Sierra Co.	3,592
Alta, Nevada Co.	3,800
Spanish Ranch, Plumas Co.	3,821
Meadow Valley, Plumas Co.	3,757
Honey Lake, Lassen Co.	3,950
Damascus, Placer Co.	4,008
Sierra City, Sierra Co.	4,188
Omega, Nevada Co.	4,201
Moore's Flat, Nevada Co.	4,231

Alleghany, Sierra Co.	4,375
Forest City, Sierra Co.	4,465
Bald Mountain Tunnel, Sierra Co.	4,489
Edman Mine, Plumas Co.	4,709
Laporte, Plumas Co.	4,993
Horse Lake, Lassen Co.	5,039
Eagle Lake, Lassen Co.	5,115
Salters Canyon, Plumas Co.	5,251
Gibsonville, Sierra Co.	5,500
Table Mountain, Sierra Co. (Howland Flat)	5,610
Feather Lake, Lassen Co.	6,035
Omou Valley, Plumas Co.	6,100
Squaw Valley, Placer Co.	6,304
Mono Lake, Mono Co.	6,730
Webber Lake, Sierra Co.	6,808
Spanish Peak, Plumas Co.	6,920
Clarendon Peak, Plumas Co.	7,006
Pilot Peak, Plumas Co.	7,009
Alturas Mountain, Sierra Co.	7,200
Kettle Rock, Plumas Co.	7,843
Summit Peak, Junction of Lassen, Plumas and Sierra counties	8,300
Mount Inalls, Plumas Co.	8,479
Sierra Butte, Sierra Co.	8,541
Lassen's Butte, Plumas Co.	10,437
Mount Shasta, Shasta Co.	14,442
Mount Whitney, Inyo Co. (highest elevation in California)	14,598

Other altitudes may be found in the Sixth Annual Report of the State Mineralogist.

Evolution of Placer Mining in California

Without referring to the working of auriferous deposits in California from the earliest settlement of the Territory, but beginning with the historical discovery of gold, this modern golden era will furnish all data required to show the evolution of gold mining from the simple methods of 1849 to the present system, the most perfect ever known.

Miners first sought gold in the beds of streams in the lower foothills, in which they could without great difficulty lay the shallow pans practically dry, by flaming, or by lifting the water with Chinese pumps. Their first tools were the pick, pan and shovel, by the use of which from \$5 to \$50 per day to the man was collected.

As miners flocked into the country, the known bars were soon claimed, and new-comers discovered and located others until it was difficult to find unoccupied ground without greatly extending the area.

With the spread of the gold excitement, miners continued to come to California from all parts of the world, and soon extended their explorations to the higher mountains beyond, gathering gold in such quantities that the price of common labor increased to \$16 per day and other values the world over were disturbed.

This condition of things did not confine long; the river gold was soon collected, and after a time all that poor men could gain by labor alone was gathered; mining became more costly, larger operations were undertaken and claim claims consolidated to increase capital, gigantic engineering works supplied water to dry diggings, attention was drawn from exhausted river-beds to river-banks, and it was discovered that although of lower grade, these secondary deposits could be profitably worked by improving methods and apparatus. This led in succession to the invention or re-invention of the rocker, long-tom and connected sluice; followed by ground-sluicing resulting by evolution in hydraulic mining, which attained a magnitude never before reached in the history of the world. It was the perfection of placer mining and was copied and used by other nations because of its admitted superiority. It ceased in California not from any inherent defect, or because the gold-fields were exhausted, but owing to a conflict between the agriculturists and miners, whose personal interests were antagonistic.

But new fields are being opened in other parts of the world; the perfected California processes will be introduced elsewhere, and it is a satisfaction to feel that if we are not allowed to operate our own prolific mines by this economic method, we may, at least, have the credit of teaching others how to work them.

While these events were transpiring, much experience was gained, the deep channels were discovered and the country underlain by them was carefully studied by thousands of men eager to obtain the gold. Miles of costly tunnels were driven into the hills, some of which were very successful, others less so, while many were failures.

To show what vast proportions hydraulic mining attained, it may be stated here that in 1867 there were 5323 miles of water ditches in the State, which cost \$15,575,400. (Pacific Coast Directory, 1867, fol. 79.) This did not include small working ditches of the gold mines.

Gold mining may properly be divided into two general classes, vein mining and placer mining; each of these again into numerous varieties. It is the province of this paper to deal specially with placer mining, admitting, however, that all the gold in the placers came directly or indirectly from vein matter. There are again two principal divisions in California placer mining, one known as drift mining and the other as sluice-washing or hydraulicking.

Placer Mining.

The simplest form of placer mining is pan-washing, in which the miner digs with a shovel a portion of earth which he supposes and hopes to contain gold. The charge is not more than ten pounds for a single operation, often less. This is put into an untanned, unsoldered, Russian sheet-iron pan. The operator sinks the pan in a convenient pool or vessel of water, the charge settles down, and, aided by a stirring, squeezing motion of one hand, becomes soft mud; a few shakes and a rotary agitation of the pan held under water cause the lighter particles to flow away or sink outside; the

gold, if any is present, sinks to the bottom and remains in the pan; the pebbles and rock fragments are then washed one by one, examined carefully and thrown aside if worthless; the shaking, rotary motion is continued, the coarse particles removed as before, until only a small quantity of fine matter remains. Then, with a skillful motion and manipulation only learned by practice, the miner causes the finer particles to overflow with the water over the edge of the pan, until at last only a little black sand and gold remain. In cleaning up the bedrock in early times, it was not uncommon to find from \$50 upward in a single pan-washing. While the pan is no longer thus used, it is indispensable to the prospector, miner and assayer, in many auxiliary operations connected with the more improved methods to be described.

The Cradle.

The miner's cradle does not differ much from an old-fashioned wooden domestic cradle. It is mounted on rockers and motion is imparted to it in a similar manner. One end is somewhat lower than the other, and the depressed end is open to allow the surplus water and tailings to escape. Over the upper part a movable box or hopper is placed, the bottom of which is of sheet iron punched with holes half an inch in diameter. Under the hopper, an apron of canvas inclines toward the head or higher part of the cradle; on the floor are nailed at right angles two riffle strips, each about an inch high. The miner sits or kneels by the cradle, rocking with one hand and dipping and pouring water with the other on the earth thrown into the hopper generally by another person. The coarse pebbles remain on the screen and are thrown aside as often as required; the lighter particles flow with the water through the apparatus, and the gold, if any, is found lying against the riffles; the cleanup is made in the miner's pan.

Long-Tom.

The next improvement was a rough wooden box trough from 12 to 14 feet long, the bottom covered with sheet iron, the sheets lapping like shingles. The lower end terminated in a sheet-iron screen with punched holes; below the screen was a sluice-box with six or more riffle cleats to intercept the gold. Unlike the cradle, water was brought to the head of the apparatus and flowed through it in a continuous stream; the rich dirt was shoveled in from the sides, and the howlers thrown out with a fork made like a common manure-fork, but with stronger tines.

Sluice-Box.

The long-tom was soon replaced by the sluice-box. This was a series of square troughs with sides and bottom alike, but open on the top; one end lapped into another and the line could be extended for any distance. With plenty of water any number of men could be employed to feed in the auriferous earth and throw out the howlers, as from the long-tom. The sluices were set at the proper angle on trestles or piles of howlers; riffles for collecting the gold were numerous along the line.

Ground-Sluicing.

This was introduced to increase the richness of the sluice material. Water was brought in a large flume or ditch to a point above some creek bottom or bedrock, and on the bank. The water was allowed to escape and soon cut a channel in its downward flow; this was assisted by men who picked down the banks of the new cut and aided the stream to disintegrate the earth by their labor. The concentrated matter left when the stream was turned off was partly run through sluices, and partly cleaned on the bedrock.

Booming.

Booming was an improvement on ground-sluicing. Water from a reservoir at a high elevation was set free by opening wide flood-gates; the effect was like that of a clodhopper. The banks were cut away and large trees uprooted. The gates were closed until more water collected, when the operation was repeated again and again. Sluice-washing followed this operation as in the case of ground-sluicing.

Hydraulic Mining.

The hydraulic miner creates artificial placers; his operations as compared with the work of Nature may be likened to his picking up a handful of sand and letting it run through his fingers. Before he could conduct this mode of placer mining, Nature by the patient work of centuries had arranged the conditions and prepared the materials.

Hydraulic mining commenced in a small way and increased by evolution until the apparatus employed was of great magnitude. The canvas hose of six inches in diameter, the tin nozzle with an inch aperture, the box reservoir at an elevation of 30 feet, grew gradually, until 2000 inches of water were caused to flow from a pressure-box at an elevation of 400 feet, through iron pipes 30 inches in diameter, to a nozzle aptly named a "glant," with from 6 to 9 inch aperture.

With incredible force the stream cut into the gravel banks, which seemed to melt before it like snow. The lighter particles, including howlers a foot in diameter, were washed away. Larger ones were either raised by derricks or blasted and the fragments piped away. To assist the force of water, tunnels were driven into the gravel banks, and sometimes as many as 2000 kegs of gunpowder were exploded by electricity in a single blast. To those who have not seen this operation, it may be said that if a hydraulic giant of the magnitude and pressure mentioned above were set up in front

of the Parliament buildings in London, and the water turned on, the edifice could be wrecked in a few minutes, and in a few hours every wall within reach of the stream could be thrown down in rain. By this process, earthy matter containing only a few cents' worth of gold to the cubic yard can be made to pay, although the original cost of the plant is very great.

While we are educated to regard with wonder the work of the hydraulic giant nozzle, and sensational writers exaggerate the destructive character of that mode of gold mining, claiming that unless it at once ceased, "the mountains would be washed into the sea," yet all the excavations made by the gold miners in California during the 42 years since the historical discovery of the precious metal at Sutter's Mill, have produced no geological effect worthy of the name. A single clodhopper will in a few hours cut out a deeper basin than that of the most extensive hydraulic mine in the State. These artificial cuttings, although of local importance, are not to be compared with the eroded canyons and glacial channels of the Sierra Nevada.

As it will be shown that all drift deposits are covered by a stratum of so-called lava, it will be clear that they cannot be piped out as from hydraulic mines. It will also be shown that the drift gold deposits are older than the hydraulic placers.

Hydraulic miners recover the gold contained in loose sedimentary matter, while the drift miner seeks the precious metal in the deep-lying channels. Even if hydraulic mining were not interdicted, that system would be powerless to reach the deeply buried gold.

Drift Mining.

While placer mining was most active in California, it was found that the drift mines were invariably on the margin of channels covered by eruptive matter; finding it impossible to pipe out or otherwise work the gravels so protected, the miners drove in exploring tunnels and met with elongated channels bearing generally with the trend of the lava ridges. These channels were uniformly of the same general character; on the bottom was found a bedrock of a soft schistose nature, on which lay rounded howlers of large size, almost invariably of quartz, intermixed with which, but on or near the bedrock, coarse gold, worn or battered, was discovered.

Boulders of the overlying lava, although not uncommon in the hydraulic washings, and abundant in modern river channels, were conspicuously absent from the beds of the drift mines. Overlying the gravels, but under the lava, was found a peculiar sedimentary deposit consisting of gravel, coarse and fine sand, and a peculiar clay, bearing in miners' parlance the general name "pipeclay;" on this, with a distinct line of demarcation, lay the superimposed lava.

As experiences multiplied, miners learned to expect a "rimrock" (so called) along the edge of the lava ridges, dipping channel-like, and terminating in a depression or a number of depressions in which much water was always met with.

Drift mining is another form of placer mining, in some features resembling vein mining. It is peculiar in being conducted through long tunnels called "drifts" by the California miners, whence its name. The term is not to be understood in a geological sense.

Believing, with reason, that gold would always be found under these conditions, the more enterprising miners drove long and expensive tunnels in the bedrock below the gravels, calculating to connect with the lowest depressions in the channels.

In some cases, after months and even years of labor and expense, finding their tunnel too high, and knowing the difficulty of controlling the water in a shaft or incline, they have too frequently been compelled to abandon the old and commence a new tunnel at a lower level.

When successful, the drift miners obtained gold in such quantities that they were amply repaid for the toll, difficulties and disappointments at first experienced; and their success was an incentive for others to do likewise.

The usual and most economical mode of opening a drift mine is to select a tunnel-site with much care and judgment in or near a ravine or other depression sufficiently low to drain the gravel channel by a tunnel driven through one of the bedrock shores of the channel. Ample dump and facilities for bringing water for washing are, at this stage, matters for serious consideration. The object of the tunnels is to reach the gravel deposits lying in the channel and take out the lowest and richest stratum of gravel, generally four or five feet in thickness. This is run out by gravitation, in cars, on a tramway laid in the tunnel, the seepage-water flows out also without inconvenience under the tramway, saving the expense of pumping machinery indispensable in a shaft.

These tunnels, averaging a mile in length, are not easily ventilated. Various appliances, which partly serve the purpose, are in use to overcome this difficulty. When conditions are favorable, air shafts are sunk or npraised, but being expensive, they are not universal, as they should be. In some drift mines, locomotive engines of special construction are used to haul cars loaded with gravel and to convey timber to points where they are required.

On reaching the channel, a turn is made in the direction of the tunnel, and the miners drive up the slight grade, aiming to follow the deepest depression.

(Continued on page 255.)

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

GOVER.—Amador Ledger, April 4: The Gover mill has been idle for a few days in order to put in some new concentrators, which are said to give better results than any heretofore in use. The hoisting works at the Hardenberg mine at Middle Bar are completed and pipe connections made, and everything in running order. The work of draining the shaft is progressing satisfactorily. The work of getting the mill in order is being pressed at the Amador gold mine as fast as the arrival of the machinery on the ground will allow. The car track near the mill is being straightened, showing that all differences with the Doyle claim have been mutually arranged. Negotiations are in progress to bond the North California and Joe Davis claims, which belong to the North California Mining Co., to San Francisco capitalists for \$40,000. The Italian mine, belonging to Ginocchio Bros. of Jackson, is being worked on a small scale, with very encouraging prospects. We are informed that a couple of pounds of gold was obtained recently from a pocket. The 20-stamp mill of the Seaton has been secured to crush the rock from this mine. The test crushing of rock from Bellwether claim of S. W. Bright has been completed at the one-stamp mill of the Amador mine. It is rumored that the yield amounted to about \$3 per ton, which is considered quite satisfactory when it is remembered that the quartz came from close to the surface.

SUTTER CREEK.—Considerable improvements have been made in the pumping machinery at the Wildman mine. Knight & Co. have changed the valves in the hydraulic engine, so as to about double the stroke, and therefore nearly double its capacity. The water is very strong, and it was with much difficulty that the mine could be kept dry. Now the mine will be much more pleasant to work in. At Howard's foundry they are turning out several iron cars for different mines in the county.

Calaveras.

JESUS LOPEZ MINE.—Prospect, April 5: Work has been temporarily suspended on this mine for the present, pending the arrival of Mr. Gifford, a wealthy mining man of Chicago. Mr. Gifford bonded the Lopez mine some time ago, and it is proposed to either run a tunnel, which will tap the vein at a depth of 200 feet, or utilize the water from San Antonio creek. This mine has a shaft on the vein 100 feet deep, with a lead from three to four feet wide; with good walls and gouge, and we are credibly informed that the quartz prospects well. Thus far the mine has been prospected without the aid of any machinery—a windlass being used to sink the shaft.

MINING IMPROVEMENT.—Rumor has it that several gravel mines will be opened on Central Hill the coming summer.

El Dorado.

NEW MILL.—Mountain Democrat, April 5: Ben Parlow has about completed a 5-stamp mill on the Gentle Annie mine, Poverty Point, with accommodations in the mill for 5 stamps more. The mill will be ready for operation about the latter part of next week. The ledge as far as opened shows up well, and the prospect is good for a paying mine.

BEAR CREEK.—Cor. Georgetown Gazette, April 3: J. P. Mathews contemplates extensive operations on his placer claim, near Peg-leg gulch, soon as weather permits. L. Bingham is pushing things right along on his seam diggings at the head of Polecat ravine. J. C. Day has several men employed in his gravel claim on Kanaka ravine, and from all accounts it is yielding him handsome returns. The Darling brothers are preparing to commence sinking on their mine. They continue to crush ore day and night at present.

Inyo.

INYO MARBLE.—Independent, April 5: Mr. W. A. Goodyear, geologist for the State Mining Bureau, made a visit to Keeler and the marble quarry last week. Mr. Goodyear visited the quarry two years ago and made a report upon it as it then appeared. He now asks the Independent to publish the fact that since his last visit large ledges of very beautiful marble have been uncovered and that blocks of any size that may be wanted can be taken out, entirely free from crack or blemish of any kind. He thinks the marble is of the finest quality and the quarry practically inexhaustible.

THE SYLVANIA MINES.—Mr. S. G. Gregg made a visit to the Sylvania mines recently. He reports having gone down a shaft to a depth of 80 feet. This shaft is in solid ore all the way and the vein varies from 6 to 10 feet and even more in thickness. The ore carries three ounces in gold per ton, 60 ounces silver, and about 60 per cent lead. This makes the ore worth about \$160 per ton. Mr. Gregg says the vein has not been explored beyond the shaft on either side along the ledge. On the surface the ledge is easily traced at least 600 feet. In the bottom of the shaft the vein appeared to continue without change. Mr. Gregg thinks the property is very valuable. This is one of the claims recently bought by Andy Fyfe and others from a prospector named Kincaid. An adjoining claim belonging to Bouchier & Son is more extensively prospected than the above. Mr. Gregg did not examine the mine, but he says Mr. Fyfe has it bonded and told him it was the better mine of the two. Mr. Fyfe will put up a 30-ton smelting furnace some time this spring. Mr. Gregg visited Sylvania as one of a committee appointed from Big Pine to lay out a new road from the railroad to the mines. The road will be 45 miles long and will be put through without loss of time.

IN THE SOUTHERN CAMPS.—Register, April 3: Most of the names mentioned in this item are more or less old-timers, and many Register readers will be glad to learn of the boys' present whereabouts: Richard Decker, John Lemoigne are chloriding in the Hemlock mine at Panamint; Jack Curran and John Lee are at work on their own properties in the same camp. Arthur Smith, Wm. Hannagan, Oscar Stickney, Crittenden Hampton and F. P. Meyers are with Fitzgerald at Medlock. With Mr. and Mrs. J. J. Gunn at the old Minniti properties are Paul Myrtengreen, Hugh McNeal, John Donnelly and Frank Elder. James McDouald continues at

the Defiance, and has Frank Bartho, Barna McDonald, Adolph Elias and J. Donahoe. "The Lucky Jim" boys are J. G. McLean, Luke Reagan and Wm. Avery, who are enjoying the hospitalities of the property owner, J. A. McKenzie. At Keeler Dave Holland, Paul Houard, Louis Schalten, J. N. Yandeli (the latter with the Union Mining Co.), Supt. Wrinkle and Foreman Gray are running the Soda Works with J. A. Reagan and A. M. Fleming and a few Chinamen. The old Swansea furnace slag-pile affords lucrative work to Mark Hand and Jim Stansbury. The Marble Works, in charge of Captain J. V. B. Bowman, employs ten good new-comers. The Union at Cerro Gordo, with our old Esmeralda friend, Clem Ogg, as foreman and Henry Stansfield as clerk, employs some 17 men, all of whom are strangers. There are 8 contractors in the mine besides, most of whom are regular residents of the old lead camp.

Mariposa.

THE FRANCIS.—News, April 5: Andrew O'cese, who now owns and operates the Francis mine and mill, was in Mariposa last week. Without giving the figures as to the yield per ton, Mr. O'cese expresses himself satisfied with the general results. There are about 16 men at work, under the direction of Richard Ham, who bears the reputation of being a competent mining superintendent. The mill is run by water-power from Mariposa creek, and the supply this year will hold out much later than in ordinary seasons.

Nevada.

RICH ORE.—Grass Valley Tidings, April 4: The Chabmon mine, Nevada district, continues to send out very rich ore, and with the Mountaineer pays dividends regularly. There should be more such mines in the locality.

PROPOSED MINING CONSOLIDATION.—Grass Valley Union, April 6: There is a proposition to consolidate the Morning Star and other great mining properties near Iowa Hill, by which drainage would be secured by the tunnel that is now being driven into the Morning Star ground, as it is now in over 300 feet.

San Diego.

ALONG THE GILA AND COLORADO.—Los Angeles Herald, April 5: Colonel Tommy Gates brings pleasant news of what is going on at Yuma. The old town is improving slowly but in a healthy manner, with an excellent prospect for the future. There is no end of development in mining in the district along the Colorado and Gila rivers. E. H. Harazthy is spending from \$3000 to \$4000 on the Gila, 15 miles up from Yuma, to make a thorough test of the gravel at that point. Then Mr. Gratz, of St. Louis, who represents a large syndicate of that city, is putting in a plant, at a cost of \$4000, to develop the "dirt" 30 miles above Yuma, on the California side of the Colorado. He pumps the water up 300 feet from the river to work his mill. He is doing well. Jim Cushingbury, the old superintendent of the Vulture mine, is putting in a plant, at a cost of \$10,000, twelve miles above Yuma on the Arizona side of the Colorado. This is at Laguna. Next comes a Mr. Kelly from one of the towns in Missouri, a newspaper man, who has secured several claims on the Gila, where he is making preparations to spend \$25,000 in a plant to work his mines. Mr. Blaisdell, of the Cargo Muchacho mine, 18 miles up the Colorado, is working "dirt" that pays \$16 a ton right along. He gets water from the river, too. He is making a ditch from the Gila to Gila City, where he has 15 acres of fine vines and 10 acres of excellent orchard. He will carry this ditch on to Yuma. There is a party of English people who have been about Yuma for some time. They have returned to London with samples of ore from all along the Colorado and Gila, and some from Sonora which they will carefully assay with a view of investing capital to take hold of the mines. Col. Gates thinks there is a great deal of fine dirt along that part of the country, and that there is a fine future in store for it. Many people of this city will be glad to know that Tommy has secured some of this rich mining property for himself, and they will all hope that it may turn out even richer than he thinks.

Shasta.

PROSPECTORS.—Shasta Courier, April 6: The country for miles around town is being investigated by prospectors and a number of very promising ledges are being worked. Many prospectors complain to us of professional locators or persons who plaster the country over with claim notices, but do little or no work except to prowl around and renew notices when dates expire.

CHLORINATION WORKS.—Redding Free Press, April 6: Charley Butter's chlorination works at Kennet are a big success. He is working ore from a wide range of mining-fields, having received shipments from South and Central America, from the Rocky mountain regions, and large lots from Grass Valley. Once having established the reputation of being able to extract a greater per cent of precious metals from rebellious ores—it is a fact that he can—than all the chlorination works of the country, it means that he will have to double and treble the capacity of his works. He now employs a force of from 10 to 20 men.

AT WORK.—A. McKay, tunnel contractor on the Scherer tellurium mine, has a force of about ten men at work. As soon as they get into the mouth of the tunnel, three shifts will be put on, running night and day, and the force will be increased accordingly.

SQUAW CREEK.—J. M. Vannoy came down Monday from the Squaw Creek mines, where he has a very promising piece of property himself. He says that the Uncle Sam, the Snyder and Brown and Black Bear mines, after a winter of idleness, have resumed operations. The Uncle Sam is running full blast, operating 20 stamps and feeding over 50 men. These mines started up about the first of last month. The summer of '90 will be a very active one in mining circles.

Sierra.

PIKE CITY.—Mt. Messenger, April 5: The Sunflower mine is working two men. It does not sound bad to hear the whistle blow every day. Chatfield Bros. are mining on Griskey creek and seem to be doing quite well. Nels Hansen and Frank Misley are mining near Alaska mine, Louis Barnes has charge of the Alaska mine now.

THE WIDE AWAKE.—Cor. Mt. Messenger, April 5: Allow me to correct your statement concerning the Wide Awake mine in your issue of March 22d. It looks odd when you state that the Wide Awake new tunnel seems to be just in the right place. The

old workings toward the new tunnel were longer than we anticipated, and the course we run direct to the old works shortened the distance so that when we raised a chute we had to run 80 feet thence to connect with the old works. This was all pure accident and our good luck. If the new tunnel was in the right place and direction we would have struck the old workings in November last, when the contract was finished, instead of running 175 feet to get there.

Trinity.

QUARTZ BOULDERS.—Redding Free Press, April 6: A man by the name of Bragdon and other parties recently struck a 20-acre lot of boulders on East Fork, Trinity county. The ore is rich in free gold and sulphurates, a quantity of which is displayed in the bank of Sabasta county, and judging from what the discoverers say themselves, it is one of the most remarkable finds ever made in these northern fields. There must be a tremendous ledge somewhere on the mountain-side from whence these boulders rolled, and if ever found may be a bonanza surpassing the Treadwell lode on Douglas island, Alaska.

DOING WELL.—Journal, April 5: John A. Hubbard of Douglas City was in town this week and informed us that his claim is turning out satisfactorily. Up to the present time he has had plenty of water and the production was all that could be expected. This is one of the richest mines in the county, but the lack of the required amount of water has prevented it from being one of the first in point of gold yielded annually.

PROGRESSING.—The Trinity Gold M. Co. has a small head of water in its lower ditch and in a few days the ditch will be cleared and repaired to the head and running full of water. This amount will give them about six hours run each day. It will take about a month to get water through the upper ditch, as it is badly demoralized. On the completion of the upper ditch it is estimated that a full pipe head will be had until July, and a partial head much longer. With ordinary good luck this company will make a good cleanup for the season.

WORK TO BEGIN.—Last week George Bailey went to the mine in which he is interested above Canyon City and returned the first of this week. He reports between four and five feet of snow there and it was so soft that he was unable to get around sufficiently to inspect the tunnels. He informs us that work on a trail to the mine will begin in about two weeks. The trail will be built on a good grade, so that by a little extra work in the way of widening it can put it in a condition to admit machinery over it should future development justify the erection of a mill. As soon as the trail is completed it is expected that the snow will be off sufficiently to admit of opening up the tunnels and starting new ones to tap the lode at a good depth. A good deal of development work will be done on this mine this summer and much confidence is placed in the future of the property.

NEVADA.

Washoe District.

UTAH.—Virginia Enterprise, April 5: On the 725 level cutting out a station on the northwest side of the shaft.

SIERRA NEVADA.—On the 630 level a southwest drift is advanced 233 feet from the shaft station, continuing in a porphyry formation.

UNION CON.—On the 1465 level from the north lateral drift, opposite west crosscut No. 4, east crosscut No. 1 is advanced 234 feet, continuing in hard porphyry.

MEXICAN.—On the 1465 level west crosscut No. 4, 100 feet south of No. 3, from the north drift from west crosscut No. 1, from the main north lateral drift, is extended 77 feet, continuing in porphyry carrying lines of quartz.

OPHIR.—On the 1300 have been working north-easterly, following the ore streak developed in the raise above the south drift, which having narrowed the drift was stopped. Are now working southwesterly from the top of the raise and extracted from those points 45 tons of milling ore during the week.

CON. CAL. & VA.—The 1300, 1435, 1500 and 1600 levels continue to yield the usual quantity of ore. Shipped to the Morgan mill 1048 tons and 1840 pounds of ore and to the Eureka 1752 tons and 1360 pounds; battery sample assays showing an average value of \$21.95 per ton. Bullion valued at \$50,549.30 shipped to San Francisco. Bullion valued at about \$55,000 now on hand in the local assay office.

OCCIDENTAL CON.—Continue to extract ore of good quality from the slopes on the 400 and 500 levels. The 650 level north drift is advanced 43 feet and continues in low-grade quartz. The 450 level south lateral drift from the north line is advanced 11 feet and continues showing high-grade ore.

NORTH OCCIDENTAL.—The 550 level joint east crosscut is extended 158 feet and continues in porphyry and clay. The north drift from the line west crosscut is extended 59 feet and continues in low-grade quartz and porphyry.

BEST & BELCHER.—On the 1000 level east crosscut No. 1 is extended 305 feet. Formation, soft porphyry.

GOULD & CURRY.—On the 400 level west crosscut No. 1 is extended 543 feet. Formation, hard porphyry.

NORTHWESTERN CON.—Shaft down 10 feet below 100 level in hard porphyry.

NORTH GOULD & CURRY AND EAST BEST & BELCHER.—West drift from main lateral showing vein matter.

ANDES.—The 420 level west drift from the shaft station is advanced 50 feet and continues in porphyry, clay and quartz.

SAVAGE.—Shipped 455 tons of ore, showing an average value of \$20 by battery sample assays. Bullion on hand valued at \$28,091.70. The 300 level south drift is advanced 143 feet. The raise above the 500 level has connected with the 400 level workings.

HALE & NORCROSS.—Ore shipments, suspended during the week on account of Nevada mill stamps being bung up, will be resumed to-day. The winze below the 1250 level has connected with the 1300 level and good ore is showing in the bottom.

CHOLLAR.—The 750 level east crosscut, 80 feet south of the north line, passed through 11 feet of fair-grade ore and the face is now in clay.

POTOSI.—The raise above the 950 level is up 90 feet and shows ore in the top, car samples assaying

\$59 per ton. The winze below this level is down 30 feet, the bottom showing streaks of fair-grade quartz. The 850 level east crosscut is in 130 feet. The face is in porphyry, showing streaks of quartz giving fair assays. The east crosscut on the same level, 400 feet south of the north line, is out 151 feet, the face in porphyry.

WARD COMBINATION SHAFT.—The 1800 level east drift is out 300 feet. The Julia northwest drift is out 260 feet.

ALPHA.—The 500 level west crosscut is out 535 feet and continues in porphyry. Repairs to the 600 level station timbering in progress.

EXCHEQUER.—The 500 level north line east crosscut is in 150 feet, and continues in porphyry. The 600 level north drift is out 215 feet, the face in porphyry.

CON, NEW YORK.—Top of raise above 800 level continues in fair-grade quartz. The 650 level west drift is out 235 feet, face in porphyry.

SCORPION.—The southwest drift from the 630 level shaft station is advanced 173 feet and continues in porphyry.

IMPERIAL.—The 300 level west crosscut, No. 2, continues in quartz and porphyry. The 500 level west crosscut continues in quartz and porphyry, and west crosscut No. 1 from the north lateral drift continues in the same material.

KENTUCK.—Sinking a winze in ore below the 950 level.

YELLOW JACKET.—During the week shipped 600 tons of ore, battery sample assays showing an average value of \$21.75 per ton.

CROWN POINT.—Shipped during the week 859 tons of ore, showing an average value of \$18.75 per ton by pulp assays. Bottom of winze below 300 level south drift continues in fair-grade ore. Stopping from the raise above the 160 level.

CONFIDENCE & CHALLENGE.—Work during the week confined to repairing drift timbering.

BELCHER.—The joint 850 level east crosscut is in 295 feet, the face in hard porphyry. The 200 level south drift continues in quartz showing spots of low-grade ore.

SILVER HILL.—The 260 level northeast crosscut from the northwest drift continues in quartz and porphyry.

SEG, BELCHER.—The 1000 level southeast drift is out 102 feet in quartz assaying from \$5 to \$15 per ton. The 850 level Belcher joint crosscut is in porphyry.

JUSTICE.—During the week crushed 207 tons of ore showing a value of \$27.56 per ton by battery sample assays. The 490 level south drift is out 553 feet.

ALTA.—The ore output this week was 320 tons, showing an average assay value of \$24.25 per ton by pulp assays.

OVERMAN.—Shipped 242 tons of ore during the week, showing an average value of \$18.47 per ton by battery sample assays, of which \$10.85 was gold. The raise above the 1200 northwest drift is extended 11 feet through ore assaying from \$22 to \$46 per ton.

Eureka District.

THE LORD BYRON MINE.—Sentinel, April 5: We learn from reliable sources that the Lord Byron mine of the Ruby M. Co. (Limited), of London, Eng., situated in this district, is looking splendid. The old stopes are showing a great deal of ore in sight, and a new discovery of ore has been made below the tunnel level which looks promising. The prospects of this mine are very bright.

Robinson District.

EXAMINING MINES.—Eureka Sentinel, April 5: S. H. Lanyon and O. T. Boaz arrived here last Saturday and departed on Sunday for Robinson district to examine some mining property under bond to them. Mr. Lanyon is of the firm of S. H. Lanyon & Bro., zinc smelters at Pittsburg, Kas. The firm supply the Eureka Con. M. Co. with the zinc the latter use in their refining process. They supply some of the greatest concerns of the kind west of the Rockies. Mr. Boaz is a gas engineer and the owner of the gas, electric light and waterworks at Pittsburg. We trust the gentlemen will be pleased with the mines they are thinking of investing in.

Wild Rose District.

RICH ORE CHIMNEYS.—Silver State, April 4: The Paradise M. Co. has been prospecting its mines to a considerable extent during the winter. In the Wild Goose they sank shafts and run drifts in new ground and discovered three fine chimneys of ore in different levels, one as deep as the 300-foot level. One of these ore bodies has been opened to a considerable extent and shows a vein of very good ore from 7 to 8 feet wide.

ARIZONA.

NOTES.—Prescott Courier, April 5: Johnson's pack train, with rich gold ore from the Crowned King mine, Bradshaw district, unloaded at the Prescott ore works yesterday. Crowned King and Oro Bella mills are doing profitable work. The Mockingbird mill, Cherry district, commenced work Wednesday last. Richard DeKuhn is manager; Frank Raymond and T. J. Flannery are the engineers. Mill lay idle for eight weeks. Chances are favorable for the speedy starting of the Tiger mill. Men are being sent out to work in the Tiger lode. John McDonald and Fred Sattes are in great need of a pack train to bring in ore from the Blue Dick mine. Eight thousand dollars in placer gold was the sum sent into Prescott last week. Teams to haul in coke, etc., and bring out bullion from United Verde are badly needed. B. T. Riggs, one of the owners of the Hillside mine, has come back to Prescott. He brought with him a great many pounds of very rich silver ore. Joe Howell is here from the Hillside and says it is the best silver property he has ever seen. S. G. Turner of Big Bug was in Prescott yesterday. He came via Lynx creek and says the Dixie and Farnham mills are running. Joe Chambers has charge of the last-named mill and is making it do excellent work. He saves almost every bit of gold. Sinking is all the time going on in the Boggs and Hackberry mines, Big Bug district, likewise in the Senator, Hassayampa district. Water is too plentiful in the Senator. Miners are rustling for pack animals to bring in ore.

IDAHO.

PINE GROVE.—Elmore Bulletin, April 2: But little has been done here this winter in mining matters, aside from the Franklin mine. The only

mines worked are the Mountain View and Hawk-eye, and they are both producing large quantities of ore. We have plenty of good mines here, but need capital to work them. It is uphill business for a poor prospector to do much in the way of development. If capitalists would come to this camp I am sure they would find a good place to invest their money in mines.

THE VISHNU IN NEW HANDS.—*Elmore Bulletin*, April 2: The celebrated Vishnu mine at this place has at last got into the hands of men capable of making it productive. Messrs. Woodrow & McCormick on Monday paid over the purchase money, \$30,000, to Jacob Keiser and the administrator of the estate, and were placed in possession of the property. This transfer is no small item for the prosperity of this camp. The Vishnu is noted for its great wealth of gold, but the property has for years been tied up in such a manner that it was of little benefit to its owners or the community. Henceforth it will be worked upon a large scale and in an advantageous manner. The mine is to be worked by a tunnel leading from the Elmore new shaft and the ore will be reduced at the Elmore mill. Daylight is certainly dawning for the Rocky Bar once more. With the Elmore, the Vishnu, the Pittsburg, the Ophir, the Wide West, the Goat, all being worked under the control of energetic men, what is to prevent the most prosperous mining season ever experienced in Rocky Bar?

THE BASIN MINES.—*Boise Statesman*, April 3: Mr. J. B. Emory, a merchant at Idaho City, says there is not a more hopeful class of men in the world at the present time than the miners of Boise county, and particularly those in and about Idaho City. There is a great deal of sluicing going on already and piles of rich dirt that have been taken out, which it has been impossible to wash for the past three years, on account of the scarcity of water, have been treated this spring with good results. Money is already becoming easier though the season has but just begun. Mr. Emory thinks this will be the best year Boise county will have experienced since the flush times of the first few years after the discovery of the camp. There is plenty of snow in the Basin. It is from one to ten feet deep. Piping has already commenced and men are sluicing on the small creeks and other streams. In speaking of the Bed Rock flume, Mr. Emory said that not one-half of the placer gold in Boise Basin has been taken out and he believed the work performed in the foregoing connection would pay largely. The company has over six miles of territory on More Creek to sluice, but it is not contiguous. A claim belonging to Frank Headen's estate cuts their territory in two sections. Headen had expended \$10,000 in preparing his ground for work when he was taken ill and died on Sunday last. A week more of labor and he would have been ready for sluicing. He thinks the Bed Rock Flume Co. will purchase the property of the heirs and thus connect all of their own. Mr. Emory further says there is a great amount of gold in the company's ground and that they will be successful in getting it out. Mr. Emory has a great deal of faith in the quartz mines of Boise county. He says they are being discovered and opened faster than any accounts are received and that by the time the placer-mining industry of the Basin shall have become less remunerative the lodes will be so developed as to insure great returns and the permanency of the mining business of the county. The products of the mills of Boise, large though they may be considered now, are as a drop in the bucket to what they will be by the time the placers have been worked out.

A STRIKE IN THE RED CLOUD.—*Wood River Times*, April 2: Last Saturday the news was received of a new strike recently made in the face of tunnel No. 3 in the Red Cloud group of mines. The strike is of two feet of solid galena, besides the usual flanking of concentration ore. As it was made in the face of the tunnel or drift, work in which had been discontinued by the former owners of the property because of an evident lack of confidence in the continuity of the ore body, this last strike is very encouraging.

LOST RIVER.—*Cor. Wood River Times*, April 2: The people of Houston are now feeling somewhat encouraged over the prospects of a mining boom. Several experts, representing a New York company, are now there and have secured working bonds on many of the best-known properties of the district, and it is said to be their intention to commence work as soon as practicable.

MONTANA.

GRANITE MOUNTAIN.—*Anaconda Review*, April 3: The output for the week ending March 27th of the Granite Mountain was 49 bars of bullion, containing 73,440 ounces fine silver and 164 ounces fine gold. A contract was let last Saturday to W. M. Price and Geo. Krier to run a tunnel level 125 feet on the Diamond mine in Red Lion district. This tunnel is to connect with a shaft now down 100 feet. From A. S. McDonald, who was in town from the Cable district last week, we learn that the Golden Gate property is looking very fine. The tunnels are now in 135 feet, and a good body of ore is encountered there about two feet thick. From A. C. MacCallum, who has just returned from a trip to Champion, we learn that that camp is on the high road to prosperity. The American Ruby have a crosscut at the 200-foot level, and have struck an elegant lead of silver ore. There is a great deal of building going on in the camp just now, and by the first of June everything will be booming.

BI-METALLIC.—This company seems determined to outlive the great Granite mine in every particular. During the past week excavations have been going on at the hoist, and lumber is being conveyed to the site for the building of an addition to the present shaft-house, which, when completed, will make the largest shaft-house in Montana. The company has paid off its indebtedness of \$600,000. Since the 50-stamp mill started up, a year ago last February, the company has been earning on an average of over \$50,000 per month over and above expenses, and has been steadily reducing the debt contracted in placing upon the property the necessary machinery. Previous to the completion of the plant, the mine had been producing at the rate of \$40,000 to \$50,000 monthly, which was shipped to Omaha. The mine has been systematically developed. Besides the 50-stamp mill, which has a capacity of 75 tons per day, the company has erected a tramway from the mine to the mill, about two miles in length, and hoisting works. It is the intention of the company to create a fund of from

\$100,000 to \$150,000 before paying dividends. A new engine has been ordered that will likewise be equal to any other in the State. When all these improvements are completed the Bi-Metallic will have one of the very best mining plants in Montana, and, in short, it may soon become the greatest producer—or at least equal the Granite. W. Thomas Hart, acting superintendent at the Bi-Metallic in the absence of J. B. Risque, is experimenting on a new process for roasting the Bi-Metallic ores, and the first test was made last Tuesday. Should this new undertaking prove a success, the company intend treating their base ores by the roasting process instead of building a smelter.

FRANKLIN.—*Deer Lodge New Northwest*, April 4: The company has expended in development something like \$12,500, which is really much less than it would have cost to have sunk a shaft to the depth of the tunnel of 391 feet. One man can handle all the waste material for two shifts of miners, while the water takes care of itself, thereby saving the expense of a hoist. The company has 930 feet more of the ledge yet unexplored, the cropping of a portion of which shows good rock.

THE ZOSOL DISTRICT.—Two fairly promising locations in this district are the Carbonate Extension and Bonanza, the properties of Wm. Zosol and Julius Richter. They are now practically only prospects. The Carbonate Extension shaft is now down over 30 feet. One carload shipped from the Emery lead last summer netted \$583, and the extension of Mr. Zosol is a lead containing similar ore. The Bonanza, the shaft of which is now down 15 feet, has ore similar to that of the Hidden Hand, in the same neighborhood. One assay made from a choice piece of rock went 46 per cent of lead and 76 ounces silver. The poorest assay went 2½ ounces silver only. The Carbonate Hill or Emery lead has more than paid expenses from the beginning.

THE AMERICAN RUBY.—The strike the latter part of last week in this mine is calculated to make the stockholders happy. At the 200-foot level the crosscut struck the footwall of the vein, which at this point measures 12 feet in width. Next to the footwall the pay streak averages 2 feet in width. Two samples from the whole of the pay streak went respectively 46.60 and 87.10 ounces silver, with about \$4 of gold. This is exclusive of the pay streak on the hanging-wall and avoiding the high-grade ore, none of the richest specimens of high-grade ore having yet been assayed. The drifting is being prosecuted east and west on the vein.

THE INCLINE.—The Incline lead, in Zosol district, is the property of Moise Menard, John Renaud and Charles Cummings. Two men have been kept at work on the lead for the last three months. An incline tunnel following the lead has been run to a length of 90 feet, with a vertical depth of from 35 to 45 feet. Two assays made last week run respectively 102 and 53.95 ounces silver. There was 3 per cent lead and 24 per cent of iron in the first assay. This does not, however, give the proper proportion of lead in the vein, as it must, the owners think, contain about 35 per cent lead.

NEW MEXICO.

DEVELOPMENT WORK.—*Silver City Enterprise*, April 5: Milt Miller, one of the fortunate owners of the Alhambra, at Black Hawk, informs the *Enterprise* that the new strike in the mine appears to be more extensive and richer than any before made. Uncle Ben Hopson of Black Hawk is still taking out rich ore, and will soon have another shipment ready. John Spiller has been employed as superintendent of the Pacific mine and mill. The lessees in the lower level of the south end of the Atlantic mine, where the ore had been somewhat pinched, have struck a good-sized body of pay ore. Iron ore is again moving from Silver City in large quantities. Hardly a day passes but what from three to six cars pass down the road. One day last week eight cars of ore, one from Georgetown, two of concentrates from the Aztec, one of zinc and four of iron from Silver City and Hanover, were shipped to various points. Zinc shipments are becoming quite a feature in our output, and the prospects are that the output of this particular class of ore will be many times doubled before the year expires. On Monday last ground was broken for the erection of a 10-stamp mill and concentrator. The site is an eligible one at the foot of the spur dipping in the valley just below town. It is put up principally for concentration the constantly increasing amount of second-class ore on the Ruby, which assays from \$40 to \$50 per ton, and of which there are 600,000 or 800,000 tons on the dump; the first-class, running from \$500 to \$700 per ton, is shipped to Socorro. This will be a great accommodation to miners and a necessary adjunct. The Graed Tower is being quietly worked with continued assurances of being a mine, and several hundred tons of second-class ore for the present will likely be concentrated at the new mill. Clark & Sullivan have a mine three miles southeast of Gold Hill that bids fair to be of some importance. They will soon ship a carload which will net \$150 gold and \$15 silver per ton.

OREGON.

PIPING.—*Jacksonville Times*, April 6: Piping is progressing at the Sterling mines at a lively rate. A big cleanup will no doubt be made there. Lansing & Drake of Brush creek have been cleaning up some ground stripped by the February flood and did well, picking up some nice pieces of gold. E. Sanderson Smith is in Steamboat district, engaged in prospecting Griffith & Co.'s quartz ledge for capitalists abroad. He has two shifts of men at work. John T. Layton of Applegate precinct has finished repairing his ditch and will commence piping at once. John Miller's extensive mines on Farmer's flat were so badly damaged by the February flood that he found it impossible to operate them this year. He may abandon them altogether if the cost of putting them into good shape again will cost as much as he thinks it will. Mr. Miller has expended several thousand dollars there and we are sorry to learn that his loss has been so great. A choice specimen of ore from the ledge of G. A. Tyler, near Grant's Pass, was laid on our table this week. It is said to assay almost 70 per cent of tin, and as the ledge is 12 feet wide and has been traced for a distance of three miles or over, the discovery of its value naturally caused considerable excitement in the vicinity of Grant's Pass. Dr. E. B. Stone of this place is now engaged in analyzing the ore to verify the assay made at San Francisco.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING APRIL 1, 1890.

- 424,599.—INCUBATOR—B. W. S. Clark, Los Angeles, Cal.
424,771.—FRUIT-PITTER, ETC.—Fleming & McLaughlin, San Jose, Cal.
424,926.—REVERSIBLE PLOW—E. S. Gerow, Lafayette, Cal.
424,782.—STEP LADDER—E. Harter, San Diego, Cal.
424,646.—STEAM BOILER—J. L. Heald, Crockett, Cal.
424,648.—TWO-WHEELED VEHICLE—J. Heilrath, Plymouth, Cal.
424,649.—VEHICLE SEAT—J. Heilrath, Plymouth, Cal.
424,656.—CONCRETE MOLD—E. L. Ransome, S. F.
424,668.—GAS ENGINE—D. S. Regan, S. F.
424,832.—CABLE LIFTER—J. C. H. Stut, S. F.
424,833.—TENSION DEVICE—J. C. H. Stut, S. F.
424,584.—RAIL-CLIMBER FOR VEHICLE WHEELS—L. A. Turner, Los Angeles, Cal.
424,842.—WAGON SPRING—W. H. Williscraft, Juniper, A. T.
424,666.—LAMP BURNER—L. Zander, Oakland, Cal.
17,725.—TRADE-MARK—Leavitt & Van Alstine, S. F.

The following brief list by telegraph, for April 3, will appear more complete on receipt of mail advices:

- California—John C. Stut, S. F., turntable; Ernest L. Rasmussen, Sacramento, and T. J. Kingst, S. F., reversible window-sash; Kliza K. Smith, S. F., marker, cutter, etc., for plaster stone-work; Joseph Oswald, assignee of Harris, Oswald & Noble, S. F., sprinkler; Rokoff E. Newin, assignor to the Vulcan Iron Works, S. F., saw-mill set works; William Gehring, San Diego, valve for steam engines; James T. Dyart, Lakeport, carriage-top litter; John Cook, S. F., sail; Hiram Butts and J. Edmonds, San Diego, brake-blocks.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast Inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

AUTOMATIC TENSION DEVICE FOR CABLE RAILWAYS.—John C. H. Stut, S. F. No. 424,833. Dated April 1, 1890. This automatic tension apparatus for the cables of cable railways consists of sheaves or pulleys journaled in frames and traveling or sliding upon vertical guides so as to rest upon the cable, the weight of the sheaves causing it to press upon the cables where they leave the driver, and thus take up any sudden temporary or unusual slack which may occur. The invention is designed to automatically regulate changes in the length of the cable such as often occur in long lines of cable, where the addition or removal of a number of cars tends to change the tension suddenly and temporarily. This device is independent of any mechanism for permanently taking up the stretch of the cable, but may be used in conjunction therewith.

TWO WHEELED VEHICLE.—John Heilrath, Plymouth, Amador Co. No. 424,648. Dated April 1, 1890. The object of this invention is to do away with that objectionable feature of this class of vehicles known as the "horse-motion" by providing for a sufficient independence between body and shafts which will enable the latter to have their up-and-down and lateral movement freely but without imparting any such movement to the body. The invention consists in a novel spring-connection for the divided shaft.

ADJUSTABLE VEHICLE-SEAT.—John Heilrath, Plymouth, Amador Co. No. 424,649. Dated April 1, 1890. The object of this invention is to provide for properly balancing a two-wheeled cart. This effect is produced by the adjustment forward or back of the seat so as to regulate its position to properly distribute the weight, this being an essential object in two-wheeled vehicles, where the whole weight is borne by the horse, instead of being wholly carried, as in the case of four-wheeled vehicles, by the wheels.

FRUIT-PITTING AND SPREADING MACHINE.—Geo. A. Fleming, Chas. F. Fleming and Geo. T. McLaughlin, San Jose, No. 424,771. Dated April 1, 1890. The invention relates to the class of fruit-handling machines and especially to that class adapted for the pitting or stoning of the fruit and delivering and spreading it out in suitable trays. The object is to provide a machine of this class of great capacity, effective and rapid in its operation, adapted to accurately out the fruit into halves, remove and discharge the stones, and deliver the fruit perfectly and distribute it evenly over receiving-trays.

STEAM BOILER.—John L. Heald, Crockett, Contra Costa county, assignor to the Heald Manufacturing Co. of California. No. 424,646. Dated April 1, 1890. This patent covers a new method of dealing with the gases of combustion and also the disposition of the water in steam generating apparatus and the methods of supplying and conveying the same. It consists in the arrangement of steam-generating apparatus in sections, so as to more effectually

utilize and apply the heat of fuel, in avoiding the danger of destructive explosion, and in securing an increased area of heating surface within a given amount of enveloping shell. The object of the improvement in steam boilers is to provide for a gradual reduction and absorption of the hot gases of combustion by exposing to them surfaces of varying temperature so that the transmission of heat will continue as long as the temperature of the gases is high enough to produce useful effect. In steam boilers, as commonly arranged, there is nearly uniform temperature throughout all portions exposed to the heat, and as soon as the temperature of the boiler and that of the gases approximate each other, or when the gases of combustion have fallen to the maximum temperature of the boiler, the transfer of heat ceases and it is lost, the gases escaping at a high temperature, and without having completed the useful effect of which they are still capable. The power of heat absorption being as the difference of temperature in the two cases, the transmission of heat is directly as this difference, and by allowing the temperature of the boiler to diminish with that of the gases (which is possible only by arranging a boiler in separate sections) the difference of temperature is maintained until the gases escape and all useful heat is absorbed.

REVERSIBLE PLOW.—Edward S. Gerow, Lafayette, Contra Costa Co., assignor of one-half to James Eva, S. F. No. 424,926. Dated April 1, 1890. An important feature in the construction of this plow is the turning it above the axis of rotation and beneath the beam; and also the rectangular landside, each of the sides forming a shoe upon which it travels while plowing upon either one side or the other. From its peculiar construction, when the plow is turned so that either of these sides is downward, it will soon be scoured bright and any adhering soil will be rubbed off and the landside can never become clogged in this manner. With this plow it is unnecessary to do any heavy lifting or any difficult work in changing the plows from one side to the other, as is experienced in the under-turn in use.

LAMP BURNER.—Lonis Zander, Oakland. No. 424,666. Dated April 1, 1890. The object of this invention is to provide a wick tube into which the wick may be readily and easily inserted. A slide plate in the wick tube is removed, and the wick is then inserted in the tube through the open side. Then the slide plate is put back, thus fully inclosing and confining the wick.

The Mining Companies' Financial Standing.

The following is the financial standing on the first Monday of the present month of the mining companies listed on the two exchanges in this city:

	Cash.	Debt.
Alta.....	\$31,061	\$.....
Alpha.....	161	.....
Andes.....	6,314	.....
Bodie Co.....	17,304	.....
Benton Co.....	\$0,073	.....
Belcher.....	31,541	.....
Belle Isle.....	4,938	.....
Best & Belcher.....	6,932	.....
Bulwer.....	11,864	.....
Bullion.....	21,231	.....
Challenge Con.....	5,321	.....
Caldera.....	7,781	.....
Chollar.....	19,101	.....
Con. Cal. & Virginia.....	135,810	.....
Confidence.....	9,558	.....
Con. Imperial.....	9,197	.....
Con. New York.....	6,072	.....
Commonwealth.....	45,061	.....
Crocker.....	4,364	.....
Crown Point.....	11,220	.....
Del Monte.....	14,850	.....
East Sierra Nevada.....	5,492	.....
Eureka.....	816	.....
Exchequer.....	15,214	.....
Gould & Curry.....	1,715	.....
Grand Prize.....	19,852	.....
Hale & Norcross.....	18,917	.....
Holmes.....	9,850	.....
Independence.....	263	.....
Julia.....	7,569	.....
Justice.....	7,226	.....
Kentuck.....	2,635	.....
Lady Washington.....	17,458	.....
Locomotive.....	1,477	.....
North Belle Isle.....	12,014	.....
North Commonwealth.....	21,060	.....
Mexican.....	8,961	.....
Mono.....	12,341	.....
Navajo.....	16,756	.....
Nevada Queen.....	12,740	.....
Occidental.....	1,055	.....
Ophir.....	5,927	.....
Overman.....	24,643	.....
Peer.....	4,305	.....
Peerless.....	11,749	.....
Potosi.....	13,602	.....
Savage.....	2,917	.....
Scorpion.....	8,065	.....
Seg. Grant & Miles.....	6,187	.....
Silver Hill.....	5,271	.....
Sierra Nevada.....	13,646	.....
Silver King.....	5,552	.....
Standard.....	11,637	.....
St. Louis.....	339	.....
Syndicate.....	4,767	.....
Union Con.....	3,524	.....
Utah.....	439	.....
Weldon.....	2,236	.....

Collecting assessments.

† Mine expenses and March bullion output not included.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, term of subscription, and give it their own patronage, and as far as practicable aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

MECHANICAL PROGRESS.

Why the American Iron Trade Must Continue to Prosper.

The phrase "phenomenal," as applied to the increased demand and production of iron and steel products in the United States, and the advance in prices which these staples have experienced within the past seven months, while many other branches of trade and manufacture have suffered from a depression in the market, is due undoubtedly to various causes. We all know what changes were wrought in the last half of 1889, and how bright is the present prospect for the continuance of activity and profitable commerce in these metals; and if the estimates and predictions of the editor of the *Pittsburgh Dispatch* are correct, the United States will be able to maintain her present, or a better, position in the iron and steel markets of the world for a long time to come.

The "phenomenal" part of last year's trade in these commodities became still more manifest when English dealers ordered supplies—limited, it is true, and certainly in marked exception to their general rule—to be shipped to them from this country; but in view of contingencies now apparently about to arise, it would not be surprising to find this phenomenon becoming a steady feature of our commercial system in the near future.

One contingency upon which this changed condition is based by our contemporary is the increased price of coal in Great Britain. This statement is made that "the London & North-western railway, which has heretofore been making contracts for coal at the rate of 6s. per ton, has been forced to renew them at 10s. as the lowest price obtainable. Such an advance in the price of the fuel that has created English manufacturers, just as the same fuel has created Pennsylvania's industries, may have the most far-reaching effects. The difference between \$1.44 per ton and \$2.40 may involve the difference between the command of the world's market for iron manufactures and the necessity of yielding the market to better situated rivals."

The *Dispatch* may be too sanguine in this view of the situation, when it continues to argue that we have such an superabundance of coal in this country that we can sell coke to England cheaper than Englishmen can import it from other European sources. The sale of 30,000 tons of Pennsylvania coke to parties in Belgium, not long since, is referred to as an indication of the trend of coke exportation, and the cause of exultation that "the condition, if permanent, implies that Pittsburgh"—with coke and iron too high in England to longer compete with the American products—"can take the place of Birmingham in the world's commerce."

—Exchange.

Files and Their Use.

To choose a flat file, turn its edge up and look along it, selecting one which has an even sweep from end to end, and having no flat places or hollows. To choose a half round file, turn the edge upward, look along it and select that which has an even sweep and no flat or hollow places on the half round side, even though it be hollow in the length of the flat side.

In draw filing, take short, quick strokes, which will prevent the file from pinning and scratching. Long strokes, no matter how long the work may be, are useless save to make scratches. Remember, it is less the number of strokes given the file than the weight placed upon it that is effective; therefore, when using a rough file, stand sufficiently away from the work to bring the weight of the body upon the forward stroke. New files should be used at first upon broad surfaces, since narrow edges are apt to break the teeth if they have the fibrous edges unworn.

For brasswork, use the file on a broad surface until its teeth are dulled, then make two or three strokes of the file under a heavy pressure upon the edge of a piece of sheet iron, which will break off the dulled edges of the teeth and leave a new fibrous edge for brasswork.

Use hasty cut files to take off a quantity of metal of ordinary hardness; second cut in fitting, and also to file unusually hard metal; smoothing to finish in final adjustment or preparatory to applying emery cloth; dead smooth, to finish very fine work, float file on lathe work.

To prevent files from pinning, and hence from scratching, properly clean them, and then chalk them well.

SOME PECULIARITIES OF IRON.—Recent experiments show that, if a bar of hard iron be allowed to cool from a white heat to a dull redness, there is a spontaneous disengagement of heat, and its magnetic properties suddenly change. In order to ascertain whether this result might be due to the heat set free by the modification of the iron, or if it required the presence of carbon, iron was experimented with containing from 0.6 to 0.25 per cent of carbon, by which means the first phenomenon above mentioned was found to be due to the molecular transformation of the iron, and the second corresponded to a change in the relation of the iron with its carbon. It takes place at 675 degrees C., when the thermometer suddenly stops and rises some six degrees, afterward resuming

its regular fall as the metal cools. This was observed with steel containing 0.57 per cent of carbon, while with only 0.19 per cent of carbon a much slighter effect of the kind was noticed at about 749 degrees; with 1.25 per cent of carbon, the two effects appear to confound themselves. When the proportion of carbon is increased, the temperature of the transformation of the iron seems to be lowered, and that of recalcination raised, so that both come to coincide in the hard steel.—*Engineering and Mining Journal*.

ECONOMICAL PUMPING.—At the meeting of the South Staffordshire and East Worcestershire Institute of Mining Engineers held on March 3, Mr. H. Lea, the president, referred to the engineering operations of the mines' Drainage Commissioners. After pointing out that the extent of district dealt with by the commissioners might be viewed as an oblong figure of irregular outline, having a length of about twelve miles from north to south, and an average width of about six miles from east to west, its area being about seventy-two square miles, the president spoke of the successive improvements which had been made in nethering the coal measures of this portion of South Staffordshire. Matters were in such a state in 1872 that there were no fewer than 139 pumping engines at work, raising 48,000,000 gallons of water in 24 hours; but to-day instead of having to pump up 48,000,000 gallons, only 17,000,000 have to be dealt with. The 139 engines had been reduced by the year 1885 to 62, and to-day the whole "come" of the district is lifted by 17 engines. Moreover, whereas by means of the old engines the cost of raising 25,000 gallons of water 100 feet used to vary from 11d. upward, the cost of doing the same work by means of the new engines is now in some cases as low as 3½d. Notwithstanding the increased cost of coal, there has been a steady improvement in economy of pumping during the past eighteen months, so that at present the expenses have been reduced, in some cases, to as low a figure as that which Mr. Lea has given. During the half-year the commissioners' engines have raised about 1,870,525,000 gallons of water, 23½ tons of water having to be pumped for each ton of mineral raised.

CONSUMPTION OF IRON IN ARCHITECTURE.—One large cause of the enormous consumption of iron which is now taking place is the great number of huge office and other large buildings which are now being erected in all our large cities, in the construction of which iron is largely used. This fact may be especially noted in San Francisco as well as elsewhere. Attention is called to this fact in a late number of *Architecture and Building*, wherein it is stated that "many of these buildings are not what they seem. To the ordinary beholder they are built of stone, brick, terra-cotta and glass, but, in fact, the entire skeleton is of iron or steel, and all other materials are merely masks with which to clothe the monster. The building is constructed on the principle of a latticed girder or braced tower. The brick or stone-work shown is a mere shell or architectural veneer, to give the building a resemblance to its neighbors. As we are apparently only at the beginning of this new era in architecture, it is probable that the demand for iron and steel for these monstrous buildings will continue at an increasing rate."

THE IMPORTATION OF IRON INTO JAPAN is increasing yearly. Last year the total was nearly double that of 1887. The increase was most marked in rails, but ironwork and sundry iron, under which heads machinery is probably included, also showed a very marked expansion. As the figures relate to last year, they obviously represent a large increase in quantity and not merely in value. The value of the iron produced in Japan is only about \$250,000 per annum, or about three per cent of the value imported. In this expansion of consumption in Japan—which has doubtless been paralleled by similar expansion in many other comparatively little-considered markets—we have one explanation of the recent upward movement of iron prices. Iron is now so extensively employed all over the world that even a slight general demand for renewals, irrespective of the constant demand for extensions, must mean a very large demand in the aggregate.

STEEL PIPES.—Steel pipes as a substitute for cast iron now form an important item for the engineer's consideration in the conveyance of water. Such pipes are being adopted for several reasons. As their weight is only about one-quarter the weight of cast-iron pipes for the same service, the matter of transportation forms an important consideration. They are also much less liable to fracture than cast iron.

ROPE TRANSMISSION OF POWER.—At Newark-on-Trent, England, a steel cable of less than one-half inch diameter transmits 30 to 35 horse power, without slip, at a speed of 2592 feet per minute, or 29.45 miles per hour. It is driven by eight-foot pulleys.

A HEAVY CASTING.—A bed-plate for an engine was recently cast at Newcastle-on-Tyne which weighed no less than 17 tons. It was taken to Sunderland on a "rolley" by 22 horses, and attracted great attention on the route.

SCIENTIFIC PROGRESS.

Scientific Experiments

An interesting home-made method of natural decorations consists simply in taking a glass or goblet and placing in the interior a little common salt and water. In a day or two a slight mist will be seen upon the glass, which hourly will increase until in a very short time the glass will present a very beautiful appearance, being enlarged to twice its thickness and covered with beautiful salt crystals, packed one upon another like some peculiar fungus or animal growth. A dish should be placed beneath the glass, as the crystal will run over. The color of the crystals may be changed by placing in the salt and water some common red ink or a spoonful of bluing; this will be absorbed and the white surface covered with exquisite tints. No more simple method of producing inexpensive or beautiful ornaments can be imagined, and by using different shapes and vases and shades, an endless variety of beautiful forms can be produced. The glass should be placed where there is plenty of warmth and sunlight.

Another scientific experiment which may interest some of the older as well as the younger members of the family may be made by suspending from the ceiling a thread which has previously been soaked in very salt water and then dried. To this fasten a light ring and announce that you are about to burn the thread without letting the ring fall. The thread will burn, it is true, but the ashes it leaves are composed of crystals of salt, and their cohesion is strong enough to sustain the weight of the ring attached to the thread.

Another curious experiment is that of putting an egg into a bottle without breaking the shell. Soak the egg, which must be fresh, for several days in strong vinegar. The acid of the vinegar will eat the lime off the shell, so that while the egg looks the same it is really very soft. Only a little care is required to press the egg into the bottle. When this is done, fill it half full of water and let it stand. The shell will absorb the lime and become hard again, and you have the curious spectacle of an egg the usual size in a small-necked bottle, which will be a great puzzle to those who do not understand how it is done.—*Exchange*.

SOUND SHADOWS.—In an interesting article on "Sensitive Flames and Sound Shadows," in the November issue of the *Popular Science Monthly*, Mr. W. La Conte Stevens gives an account of the experiments made in the Bay of San Francisco in 1874 by Prof. John La Conte and his son, Mr. Julian La Conte. The source of sound was not such as would give a definite pitch, like a bell, but the quick, violent, single impulse due to the explosion of dynamite employed in the blasting of rocks which obstructed the channels. The intensity of the shock thus propagated was such as to be felt as a blow on the feet of a person seated in a boat 300 feet or more from the detonating cartridge, and to kill hundreds of fish. Several vertical posts or piles, each about a foot in diameter, projected from the ground out of the water in the neighborhood. A stout glass bottle was suspended in the water about a foot in the rear of one of these piles, within the geometric shadow determined by lines supposed to be drawn from the cartridge 40 feet horizontally away. The bottle was perfectly protected from the shock of the explosion. It was then put in front of the pile. The first shock shivered it into hundreds of fragments. Other bottles, some filled with air and some with water, were similarly exposed in various directions around the pile, and with the same result—destruction, except when within the protecting shadow. The experiments were varied by immersing stout glass tubes, incased in thick paper, horizontally across the direction of the sound rays in water, between two piles which were aligned with the dynamite cartridge. These piles were 12 feet apart, the nearer one being 40 feet from the cartridge. Its shadow, therefore, just covered the second pile, and included the intermediate water, with the middle part of each tube. After an explosion these protected parts were found to be unbroken, while the ends which projected on the two sides beyond the shadow were completely shattered. The boundary between the regions of shadow and noise was sharply defined on the tubes, even at a distance of 12 feet behind the protecting pile.

THE STAR VEGA.—One of the most beautiful stars in the sky, and one that has been admired in every age of the world, is the star called Vega, in the constellation of the Lyre. It is remarkable for the exceedingly delicate tint of blue in its light. This star may be seen almost directly overhead at midnight in the middle of the summer, and with its soft radiance it forms one of the most charming features of the celestial landscapes at that season. In the early winter evenings it flashes low in the northwest. But, when we look at Vega through the megascopic eyes of the parallax hunter, it changes from a delicately beautiful star to a most portentous Cyclops of space. The distance of Vega, according to Dr. Elkin's measurement, is about 97 light-years, or more than 6,000,000 times the distance of the sun; and since we know that light varies inversely as the square of the distance, it is easily seen that Vega really pours forth more light than 900 suns like ours combined! Its heat is un-

doubtedly in the same proportion, so that if the earth should come as near to Vega as it is to the sun, we should wither into cinders before the fierce blue flash of its overpowering rays.—*New York Sun*.

WITHOUT FRICTION.—After showing that friction makes perpetual motion impossible, Prof. Hele Shaw reflects upon the state of affairs that would follow if friction were to cease to act. The whole force of nature would be at once changed, and much of the dry land and most of our buildings would disappear beneath the sea. Such inhabitants as remained a short time alive would not only be unable to provide themselves with fire or warmth, but would find their very clothes falling back to the original fiber from which they were made; and if not destroyed in one of the many possible ways—no longer dissipated by friction through the air, or by falling masses of water, no longer retarded by the atmosphere and descending as rain—would be unable to obtain food, from inability to move themselves by any ordinary method of locomotion, or, what would be equally serious, having once started into motion, from being unable to stop except when they came into collision with other unhappy beings or moving bodies. Before long they, with all heavier substances, would disappear forever beneath the waters which would now cover the face of a lifeless world.

ICEBERG DUST.—One of the most interesting contributions of Prof. Nordenskjöld to popular science is his examination—when about 80° N. latitude, before reaching Parry's Island, to the northwest of Spitzbergen—of the snow which covered the icebergs, and which had come from still higher latitudes. He found it strewn with a multitude of minute black particles, spread over the surface or situated at the bottom of little pits, a great number of which were to be seen on the outer layer of snow; many of such particles were also lodged in the lower strata. The dust, which became gray on drying, the professor found to contain a large proportion of metallic particles attracted by the magnet, and capable of decomposing sulphate of copper. An observation made a little later upon other icebergs proved the presence of similar dust in a layer of granular crystalline snow situated beneath a stratum of light fresh snow, and another of hardened snow. Upon analysis, Prof. Nordenskjöld found this matter to be composed in varying proportions of metallic iron, phosphorus, cobalt and fragments of Diatomaceæ.

A SUBSTITUTE FOR ARSENIC.—The British Consul at Nish, in Servia, in his last report mentions that at Avala, near Belgrade, quicksilver is abundant in conjunction with a green-colored mineral which has been named avalite, the properties of which are still unknown. It is hoped that, among other uses, it may be found possible to apply it as a substitute for arsenic as a coloring body, in which event the discovery will prove a very valuable one, as avalite is said to be free from the poisonous qualities which make the employment of arsenic so dangerous. The discovery of the position of the mine is due to Prof. Clerics of Belgrade, who came upon the ancient Roman works after a search of five years. Negotiations for its purchase and working by an English company are in progress. The *Chemical Review* remarks that the new mineral, it presumes, is to be substituted for arsenical green pigments.

MAGNETIC FINGERS.—The scientists connected with the Johns Hopkins University are engaged in investigating the peculiar power possessed by the fingers of Louis Hamberger, son of a well-known merchant. If the hands of the young man are touched by any polished object, they hold it like a magnet. He can thus raise up a large number of pins. His index fingers possess the quality more than the others. He also raises up a glass tube freighted with a six-pound weight.

LIFE IN THE WATER OF SALT LAKE.—Recent observations of the waters of Great Salt Lake prove conclusively that the statements made that no form of animal or plant life exists in the lake are erroneous. No fish or other large form of animal life has been discovered, but the presence of vegetable organisms in the lake may be considered a fact from the abundance of animal existence.

THE OLDEST OBSERVATORY in the world is located at Pekin, in China. It was founded in 1279 by Kihla Khan, the first Emperor of the Mogul dynasty. There are still in it three of the first instruments of observation. These were used for the observation of Halley's comet, in 1738, and may also be used when, 22 years hence, this comet again appears.

THE YARD STICK MEASURE FOR THE STARS.—The distance that light can travel in a year, which is 63,000 times the space separating the sun from the earth, or, in round numbers, 5,859,000,000,000 miles, is taken as the unit of measurement for star distances; and this yardstick for the stars is called a light-year.

LACK OF SYMMETRY IN THE HUMAN FACE.—The two sides of the face are by no means alike. As a rule, says a German professor, the want of symmetry is confined to the upper part of the face. Among other singular eccentricities is the fact that the right ear is almost invariably higher than the left.

GOOD HEALTH.

Cure for the Blues.

No man is so miserable but who may find some one poorer and more comfortable. "Sometimes when I am blue and feel deserted, I am pleased to call to mind," said a Lichen-street wholesaler, "the day that I learned a practical lesson, and it was not very long ago, either. I was feeling awfully blue and lonesome. I saw no joy in life. I didn't know whether I was worth a dollar or not. All ventures seemed to me to fail. My wife noticed it and said, 'What's the matter?' I told her. She looked sad and went away.

"Pretty soon she came back to me and said, putting her hand on my head as I sat in my chair: 'My dear, our neighbors down under the hill in the little house are poor. I wish you would go down and see them. You had better take down some apples and potatoes, and I will find something to send to them by the time you are ready.' Then she looked in my face, and I saw something that made me feel like minding her. Well, I did as she said. I put a bushel of apples, a bushel of potatoes, some pork and other things in the wagon. But my wife added a lot of clothes from the wardrobes of our girl and boy, who had outgrown them. Then I started, and in due time got to the house. I saw there some one more miserable than I was. As I pondered our homely gifts into a washtub set to receive them, I got my first lesson in the relations of wealth. To see the woman weep tears of joy at the sight of apples and potatoes and children's cast-off clothes; the little ones, half naked, view them with wonder and almost with alarm, set me to thinking, and I said to myself, 'Man, you have done wrong. You have neglected to appreciate what has been done for you. Why, you are rich, fabulously rich, for you have a home, a business, a loving wife, and all the comforts of life.'

"A great change came over me. I grew calm and still but content, and I have never been downcast since then that I didn't seek some poor fellow more wretched than I in the hope that we both might be made less so together by mutual ministrations."—*Ez.*

SLEEP.—How many hours sleep do you require? As many as you can get. That is the general answer to such a question. No rule can be laid down. Jeremy Taylor thrived on three hours, and so does Cardinal Newman. Many centenarians are contented with five hours, but some of them require eight or nine. Unless you are afflicted with a pronounced insomnia—a thing widely different from occasional and even troublesome wakefulness—you are foolish to employ any kind of narcotic drug. But there are two rules of sleeping that everybody may adopt without hesitation. (1) Never let yourself be awakened by anybody else, but wait until you have slept out your sleep. (2) Get up as soon as you wake. If you follow these two rules, the hours of sleep will very soon regulate themselves. If you read yourself to sleep you should read a heavy book, not a light one—a book that taxes and tires your brain, not one that stirs and stimulates it. A dull book is good, a stupid one is better.—*St. James Gazette.*

SCRATCHING THE BACK INSTEAD OF QUININE. Dr. Alois Fenykovich communicates to a Vienna medical journal an account of some observations made on the treatment of intermittent fever by means of friction of the back along the spine. Many years ago, as stated in the *Lancet*, while at Nisch with his regiment, there occurred so many cases of intermittent fever that the stock of quinine was becoming exhausted, and, in order that the patients might not be entirely without some sort of treatment, it was ordered that they should be rubbed twice a day along the spine with simple ointment. The day after this order had been given, it appeared that the usual attack had not come on. Accordingly, since that time Dr. Fenykovich has very frequently employed this treatment, and usually with marked success. Indeed, he says that three-fourths of his cases have done very well without any quinine at all.

DEFECTIVE HEARING.—Over 9000 children have been examined in the schools of the following cities—New York, Stuttgart, Bordeaux, Munich and Glasgow—and the average of defective hearing pupils is 26 per cent plus. As a comparison test between children who were regarded as bright and those considered backward and dull scholars, teachers were requested to make a selection of 70 of each group. The results of the two sets, says the *British Medical Journal*, show twice as many with defective hearing among backward children as among the forward children.

CURE FOR PNEUMONIA.—Chop some onions fine, and heat in a large spider, add rye meal and vinegar to make a thick paste, and simmer for five or ten minutes. Stir it thoroughly, put it in a cotton bag large enough to cover the lungs, and apply to the chest as hot as the patient can bear; when this gets cool, apply another; thus continue, and in a few hours the patient will be out of danger.

DON'T USE CARBOLIC ACID.—Dr. T. Billroth of Vienna states that insignificant injuries are frequently made serious by the uncalled-for ap-

plication of carbolic acid, which skillful surgeons are using much less than formerly. It may cause not only inflammation, but even fatal blood-poisoning. This, therefore, should be remembered by all mechanics. Salicylate of soda, in a moderately weak solution, is infinitely better than carbolic acid for every purpose to which the latter is applied in medical or surgical practice.

OLIVE OIL FOR SNAKE BITES.—It is stated that Dr. C. R. Early of Ridgeway, Pa., uses olive oil as a cure for rattlesnake poison. It is given in doses of a teaspoonful. Half a dozen doses at frequent intervals are sufficient. The doctor has treated many cases, always successfully. Care should be taken to secure the pure article.

USEFUL INFORMATION.

A SERIOUS REFLECTION.—It is a significant fact that out of the 1060 prisoners in the Eastern Penitentiary of Pennsylvania, only 19 are mechanics. This is a strong argument in favor of mechanics as an elevator of public morals. The percentage of men engaged in mechanical pursuits to the entire male population is large, yet there are less than two per cent of the persons in this institution, and the proportion is said to be about the same in others, who are mechanics by training. Instead of trying to impress upon them the repeated saying of Horace Greeley, "Go West, young man," it might be well to advise more of them to learn trades as a prevention of crime and immorality. For the above reason, and from the further fact of the organized efforts to limit the employment of apprentices, the *Scientific American* suggests the establishment of private and public industrial schools where boys may be taught trades—such as carpentering, brick and stone masonry, molding and all branches of ironwork, etc. There can be no question but that not only mechanical employment, but all kinds of labor, both manual and mental, lessen both crime and sickness. Let us, then, give the boys a chance to earn an honest living, even though it be largely at public expense.

PLAYGROUNDS ON HOUSETOPS.—A plan for school playgrounds, which has obtained in London for some years, has been mooted in New York in connection with new school buildings in the crowded tenement district of the East Side. In these regions, space is limited and dear, and the playrooms are usually in dark and damp basements. Now it is proposed to try the experiment of having playgrounds on the roof. The plan is to carry the walls up another story, but to have no roof. In wet weather a canvas top would be spread over the room, but at all other times the children would have the full benefit of the air and the sun. This experiment has been tried in London and has been found to work satisfactorily, and in one case a glass roof—forming a "crystal room"—was set up, to the great delight and comfort of the little ones. The *Sanitary News* assumes that the aerial experiment in playgrounds will certainly be tried in connection with one of the New York schools.

TWINE FROM WOOD FIBER.—It is said that two Wisconsin men have secured a method of making harvester twine out of ordinary pine wood. The discoverers have applied for a patent, and pending its issue are guarding their secret, in regard to which a contemporary says: "It is well to give publicity to new ideas, whatever 'crankiness' they indicate, for sometimes the 'crank,' like Galileo, becomes the honored inventor of something—a theory, a practical method of performing useful labor, a machine or a new article of commerce. But of the two discoveries here recorded, the twine-makers' seems to have the best foundation and the most money before it."

A NEW ROPE FOR POWER TRANSMISSION.—A Scotch inventor makes a solid round band or rope for power transmission by impregnating flat webs of canvas or other fabrics with a solution of gutta-percha, rolling it upon itself and wrapping with cloth. A flat web is made in a similar manner by folding the fabric into layers of the desired width and passing it through pressure rolls.

PAPER-BOX MANUFACTURE.—The millions and billions of boxes manufactured for confectionery and general light commodities create an immense industry. As an article of manufacture, it is important that the boxes must be in the most compact form, as their cheapness will not justify much factory or storage room.

CHEAP CLOTHING.—John F. Plummer of New York said the country is suffering under a popular prejudice that better clothes can be got abroad than here at the same price. He declared there was no country where a man could get as good a suit of clothes for as little money as in the United States.

A NOVEL FLOWER has been found at the Isthmus of Tehuantepec. This floral chameleon has a faculty of changing its colors during the day. In the morning it is white, when the sun is at its zenith it is red, and at night it is blue.

It is said that seven-eighths of the subscriptions to the magazines are from women. This shows good taste on their part.

ELECTRICITY.

Danger from Electricity.

The continuous current is like a snake which strikes once and loses its fangs. The alternating current is a snake which can strike again and again. The latter current is coming into use in electric lighting, and it may yet be employed in the transmission of power. Theory indicates certain advantages in its use over that of the continuous current. The dangers from its employment are very great, and will need careful safeguards.

It is not, however, the possible risk to life in the contact with the ground and a dangling dead wire which has come in contact with the overhead system of electric propulsion that constitutes the most serious danger from electricity. What is most to be feared is the ease with which extensive fires can be started in cities by means of bare or poorly insulated electric circuits, of which the earth forms a portion. The electric current seeks to return to the generator which produces it by the path of least resistance.

If, therefore, a telegraph or telephone wire, or any metallic conductor, should come in contact with a bare wire conveying a powerful current, this current would seek the ground by every possible way; and if the telegraph or telephone wire should be connected with the ground, the powerful current would be directed through telegraph or telephone instruments in offices and houses to ground connections. It is said, in reply to this view, that lightning frequently has entered houses by telephone and telegraph wires, and has merely burnt out a coil, or fused a wire, and has not caused any serious conflagration. A sudden discharge through a circuit, however, is not so dangerous as a slow, insidious heating, which might go on for several hours before it is discovered. This heating could easily be produced by a portion of a powerful current leaking into houses and offices from a wire which has fallen upon a bare circuit through which a current is flowing. What is to prevent, it may be asked, a great city being set on fire by electricity, in a hundred places at once, on the night of a blizzard? The inquiry is certainly not a frivolous one. The elements of danger are with us, and the questions of safeguards demand the most careful consideration by our municipal authorities.—*Prof. Trowbridge, in March Atlantic.*

DREAM OF ELECTRICITY.—"The great development in electricity will be, I am firmly convinced," said Mr. Edison to an interviewer in Paris, "in discovering a more economical process of producing it. At present we only get from coal consumed about four or five per cent of its latent electricity. The rest is wasted in heating water, expanding steam, pushing pistons, turning wheels, and finally causing a dynamo machine to operate. A process will ultimately be found for extracting 90 to 95 per cent of the latent electricity directly from the coal. Then steam engines will be abolished, and that day is not far off now. Already we can get electricity direct from coal to the amount of 90 per cent, but only for experimental purposes. When I was on shipboard coming over, I used to sit on deck by the hour and watch the waves. It made me positively savage to think of all that power going to waste. But we'll chain it up one of these days, along with Niagara Falls and the winds. That will be the electrical millennium."

AN ABSURD THEORY.—One of the latest theories advanced is, that the generation of so much artificial electricity as is now going on is changing the constitution of our atmosphere, and causing the heavy and numerous storms and epidemics which we are experiencing. It has been said that many worthy people can never be thoroughly happy unless they are miserable, and this new theory will probably give them something to worry about for awhile. It evidently owes its origin to the erroneous supposition that all the electricity generated by our dynamos is thrown off into the atmosphere, or into the ground, in the form of electricity, whole, of course, is absurd.

A NOVEL ELECTRIC SHOCK.—A painter received an electric shock the other day under somewhat novel conditions. A leaky gas pipe caught fire and soon ignited some electric-light wires which passed near it, melting off the insulation, which in turn was communicating the blaze to the surrounding woodwork. At this point a painter dashed a bucket of water on the burning matter, but received, as a reminder that he was dealing with the electric fluid, a sharp shock from the current running back along the water to his hand.

MOVABLE TELEPHONES.—There are some people who make queer dispositions of their telephones. A well-known undertaker of New York has his telephone on a dumb-waiter. He runs it up to his room at night, and can answer it without getting up. In the daytime he runs it up out of sight after he has used it, and when the people who are always wanting to "use your telephone for a moment" drop in for that purpose, he tells them they can use it if they can find it.—*Electrical Review.*

CHEMICAL AND FRICTIONAL ELECTRICITY.—Some one asks, what is the difference between electricity generated by chemical process and

that generated by friction, magnets and otherwise? The answer given is that the difference consists in tension or potential; frictional electricity has very high tension compared with that generated by a battery.

The longest distance over which conversation by telephone is daily made is between Portland, Me., and Buffalo, N. Y., about 750 miles.

ENGINEERING NOTES.

A PNEUMATIC STREET RAILROAD.—A street railroad about one and a half miles long, on an entirely new principle, is being constructed in Washington by the Judson Pneumatic Railway Co. of New York. In this system, power is to be transmitted by compressed air from a central station to a series of motors placed beneath the track at intervals of about 1500 feet. In a conduit between the rails, similar in construction to a cable-railway conduit, revolve a smooth cylinder, or series of cylinders coupled together at the ends, about six inches in diameter. These cylinders are to be kept in continuous rotation by the compressed-air motors. An adjustable blade or arm, projecting from the bottom of the car, and passing through the narrow slot into the conduit, carries at its end a group of friction-wheels, which may be pressed down forcibly upon the upper quarter of the revolving cylinder. The plane or revolution of these friction-wheels may be changed by an ingenious device controlled by a lever, to be operated by the driver of the car. While the friction-wheels revolve in the same plane as the cylinder, the frame supporting them is at rest, but the moment the axes of the wheels are thrown out of line with that of the cylinder, by a movement of the lever, the frame is driven along the cylinder by the diagonal travel of the wheels, which is similar to that of the traveling ink-distributor on some of the old-fashioned printing presses. The speed of the car is regulated by the angle of inclination of the friction-wheel axes, the cylinder revolving continuously in one direction at a uniform speed.

PECULIARITIES OF THE FORTH BRIDGE.—The 51,000 tons of steel employed in the Forth bridge is that known as mild steel, and was made on the open-hearth or Siemens-Martin process. Two qualities were employed, one to resist tensile and the other compressive strains, having strengths respectively 30 to 33 and 34 to 37 tons per square inch in tension. Under the combined circumstances of the most adverse conditions for the stability of the structure, the maximum rolling load, and the fiercest hurricane, the strain will never exceed $\frac{7}{8}$ tons per square inch and in some parts considerably less. It will readily be perceived how ample is the margin of safety allowed. The changes resulting from variations of temperature have of necessity to be allowed for, and in so large a structure they are considerable—an inch for every 100 feet being arranged for in expansion and contraction, the space over the whole length of the structure gives for this purpose no less than seven feet. For each pier and cantilever, with part of the connecting girder which it has to carry, 18 inches of play have been designed. The surfaces of the bridge requiring to be kept painted is no less than 20 acres, while the rivets employed, if laid end to end, would cover about 380 miles in length, and the plates used in the construction would extend a distance of over 45 miles.

PROGRESS OF THE MANCHESTER SHIP CANAL. At the half-yearly meeting of the shareholders of the Manchester ship canal, held lately, a report on the progress of the work was presented. From this it appears that during the last two years the contractors had carried out a proportionate part of the excavations required to be done, though during the first two months of 1888 they were necessarily employed in making preparations which had enabled the work to be carried on continuously without a hitch. During the last five months of the past year, weather and floods hindered the work, but had not done any permanent damage. It was the intention of the contractors to work day and night during the present year, in order to get well forward with the excavation. The masonry and concrete work was proceeding steadily. Besides the actual excavation of the canal, the railway embankments were now in a forward state, and the viaducts required were in course of construction.

THE SIBERIAN RAILROAD.—Recent foreign correspondence states that the Russian Government has decided to push vigorously the construction of the proposed railroad across Siberia. Gen. Annenkoff, the builder of the Trans-Caspian road, reckons that the entire line to Vladivostok will cost less than \$200,000,000, and that through trains can be run from the Baltic to the Pacific within five years from the beginning of construction. The development of Siberia by a transcontinental railroad would be of vast importance to the civilization of the world. This is a great undertaking indeed; but the magnitude of any great enterprise is no bar whatever to establishing it if it presents a reasonable indication for profit. The length of this new line of railway and the obstacles that must be encountered in its building would have been insurmountable a decade ago, but in this age obstacles only spur projectors to greater effort.



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[NEW THIS WEEK]

Artificial Stone—George Goodwin.
Mercantile Register—Register Publishing Co.
See Advertising Columns.

Passing Events.

There is no change in the local industrial situation as regards the strike of the molders. A number of men have been brought from the East by the Foundrymen's Association, and while some of these have been captured by the strikers, others have gone to work in the shops. During all this trouble more or less work has been sent away from the city to be done elsewhere.

The utilization of power furnished by city water works for generating electricity to light the town, as successfully put in practice at Waterville, mentioned in another column of the PRESS, furnishes an example that may well be followed in other places on this coast where similar conditions exist.

The sunny, pleasant weather of the past week will have the effect of starting industrial operations of all kinds in all parts of the State, for it is an earnest that the long and severe winter is at last over. Building operations in this city, which have been at a standstill for months, have again commenced. The cessation of rain will also benefit mining, since the miners can now do something more than pump, which is about all that has been done for some months.

The prospect now is that we will have a very prosperous season in almost all branches of business, and that labor will be in demand. A great deal of work must be done to make up for the time lost the past winter. Altogether, the outlook is very favorable for California.

"Sampling Ores."

The *Territorial Enterprise* of April 1st attempts to instruct the public in the relative value of ore assays, classed as "car samples" and "battery assays."

While always willing to learn, it is just as well for the public to have as many points connected with the subject as possible, and therefore the PRESS takes pleasure in calling attention to a very few legally developed facts. We do this in behalf of our numerous readers, many of whom have been and still are assessment-payers and owners in Comstock mines.

Governor Stevenson of Nevada, in January, 1882, contracted with the Kentucky Mining Company, wherein he agreed in writing to return to the aforesaid company 65 per cent of the car sample or mine assay value of its ore milled by him.

Surely, the Governor, with his 35 years' experience in milling and mining Comstock ores, would not have signed such a contract if the car sample or mine assays were so totally unreliable as the *Enterprise* would have its readers believe; and withal so worthless as a check against the millmen returning less than they should to the mine for whom they were working ore. Mining stockholders contend that it is the only check against the mill retaining more than the actual loss incurred in reducing a mining company's ore to bullion. [Copy of the contract can be seen at Kentucky Mining Co.'s office, Pine St., S. F.]

Senator John P. Jones, as a witness in the trial of the Kentucky case in Department 6 of the Superior Court of S. F., Cal., in December, 1888, testified that he always, in case of milling ores, kept the car samples or mine assays for self-protection, and also to show, by comparison with the battery assays, that he was working the ores up to a satisfactory percentage of their mine value.

As a verification of this testimony, we append a copy of his weekly report to the Con. Cal. and Virginia mine when he was working their ores by contract in 1885.

AVERAGE ASSAY VALUE OF 2009 TONS OF ORE.

	Gold.	Silver.	Total.
Per car samples.....	\$3,492	\$20,443	\$23,935
Per R. R. car samples.....	9,106	20,287	29,393
Per battery samples.....	8,169	15,536	23,705

YIELD IN BULLION PER TON.

	Gold.	Silver.	Total.
.....	\$9,674	\$12,326	\$22,000
.....	W. H. LOWELL,		
.....	Clerk Con. Cal. and Virginia M. Co.		
.....	Virginia, Nevada, May 30, 1885.		

Here it will be seen that Senator Jones worked these 2009 tons of ore and returned to the company more than 76 per cent of the car sample or mine assay.

[A copy of the above report can be seen at the Con. Cal. and Virginia M. Co., Nevada Block, S. F., Cal.]

Why, then, did Senator Jones deem it necessary to make a report embracing all the ore assays? Aside from the fact that it was merely an act of justice to all stockholders, he was probably aware that the laws of the State, under which this mine was incorporated, compelled himself and all other contractors and superintendents to make just such returns, under oath, as he made. He was simply obeying the legislative Act of April 23, 1880.

We respectfully call the attention of all Virginia newspapers and superintendents of mines on the Comstock to the Act of April 23, 1880, and ask them why the law is not obeyed, as it was by Senator Jones in making his bullion returns to the Con. Cal. and Virginia Mining Company.

If the would-be teacher of the *Enterprise* should conclude to continue his system of instructing assessment-payers, let us suggest that the next lesson may give in detail the secrets of that wonderful Chollar mill. Numerous tons of ore from Hale and Norcross reported by the superintendent to average at the mine above \$40 per ton fail to give more than 50 per cent of that value at the mill.

Our attention has been called to some of the pan elimes or tailings, which look as though they had passed through a very coarse battery-screen, and they assay about 30 per cent of the assay value of the ore from which they are reported to have come.

When 25 per cent of the gold and 30 per cent of the silver assay value of ore is to be found in tailing elimes, something is radically wrong. Therefore it is suggested that superintendents of those mines obey the law, and that our enterprising teacher devote a few hours of each

day studying the manipulating of mill-screens and amalgamating pans; more particularly those pans which are constantly at work on pan-slimes for the benefit of the mill-owners. By careful study these pans may, perhaps, give away the secret of why mine assays and railroad car samples have been withheld from the stockholders of the Comstock mines for the past four years.

To supplement these remarks, the following paragraph is taken from the *Virginia Chronicle* of April 2d: "From 1875 to 1878, when nearly all of the available stamps on the Comstock and vicinity were dropping on Con. Virginia and California ore, a contract was made with mill superintendents that a certain percentage of the assay value of car and wagon ore samples must be returned in bullion, the superintendents agreeing to pay reclamation on shortage in the bullion returns if they fell below the percentage agreed upon, taking the assays made at the mines as a basis, and receiving a premium if the returns exceeded that percentage."

The Technical Society.

The regular meeting of the Technical Society of the Pacific Coast was held on Friday evening last, President John Richards in the chair. Randall Hunt, superintendent of the contractors at the building of the seawall, read an instructive paper, "Construction of Cofferdams." He said there was probably no other subject in engineering so little understood. He described coffer-dams as being temporary structures for the purpose of pumping out the water, in order that the permanent structure might be built, and said the most difficult of the kind he built was in sand. He showed a drawing of the Chippewa river dam on the Chicago, Burlington & Northern railroad, in which the coffer-dam was a partial failure. In the course of his remarks he expressed himself as favorable to caissons instead of coffer-dams and orlins. He described the caisson now being used in the construction of the seawall at the foot of Market street, in which the caisson method has superseded the coffer-dam method. At the close a vote of thanks was tendered the speaker, and a motion was carried to disband the paper at some future meeting.

Luther Wagoner described some experiments in stretching steel bars.

By reason of the early departure of Hubert Vischer to Honolulu, a resolution thanking that gentleman for his past services to the society was adopted.

A communication from the American Society of Engineers was read requesting the society to use its influence to test the Bear valley arch dam on the construction of the newer and higher dam, observing if any deflection occurs, as such experiments may throw considerable light on the elasticity of masonry. On motion it was decided to appoint a committee to consider ways and means for such experiments. The committee consists of E. J. Molera, Ross E. Browne, Prof. Frank Soule, Luther Wagoner, and L. N. Clement.

THE MARSHALL MONUMENT.—The State Commissioners appointed to erect a monument in memory of James W. Marshall, the discoverer of gold in California, decided to install the statue in Coloma, El Dorado county, immediately after the adjournment of the Convention of the Grand Parlor of the Native Sons of the Golden West, which will convene in Chico on the 28th of this month. The monument has cost \$5000, will be 41 feet high, consisting of a bronze statue of Mr. Marshall 11 feet high, surmounting a granite base 30 feet high, and will be placed on the lot in which the discoverer of gold is buried.

THE BEAR'S NEST.—Messrs. Venator and Bernhardt, the two German mining experts who have been examining the Bear's Nest mine, Douglas island, Alaska, have returned. It is understood that the mine is almost a complete failure. It is not likely to be abandoned, however, until a more thorough examination is made. English and German inventors are thus far heavy losers in the venture.

At Shamokin, Pa., the Cameron colliery fire got beyond control, and they had to flood the entire mine, with its 25 miles of galleries.

A HOLE accidentally burned through the roof of the caisson of the huge North River tunnel has caused the flooding of the tunnel.

Elasticity of Masonry.

The Bear Valley Dam.

The residents of Mill District, San Bernardino county, recently held a mass meeting and appointed a committee to investigate the condition of the Bear Valley dam. This committee this week reported that in its present condition, owing to the immense volume of water that would probably pour into the reservoir from the melting of the winter's snow in the mountains, they deemed the dam insecure, and that in order to make it safe the lake should be lowered to a depth of 40 feet.

The owners of the reservoir, after hearing the report of the committee, acted immediately upon their suggestions, and the water in the lake is being released as rapidly as is thought safe.

The Bear valley reservoir is situated in the San Bernardino mountains, at a great altitude above the valley. It is one of the largest artificial lakes in the United States, and is used to irrigate thousands of acres in the foothills and along the Santa Ana hills. The water of the lake empties into Bear creek and thence into the Santa Ana river. The valley of Santa Ana is quite densely populated, particularly Mill district, and the bursting of the dam would cause great loss of life and property for miles along the river.

A new and higher dam is about to be constructed below the Bear valley arch dam (which is the boldest arch dam in the world) in such a manner that the arch dam will be gradually relieved of strain by letting in water below it, which process may be repeated several times. These conditions afford a unique opportunity, never likely to recur, for determining the elastic yielding of said dam under strain, and the coefficient of elasticity of masonry as to which there is at present very imperfect information.

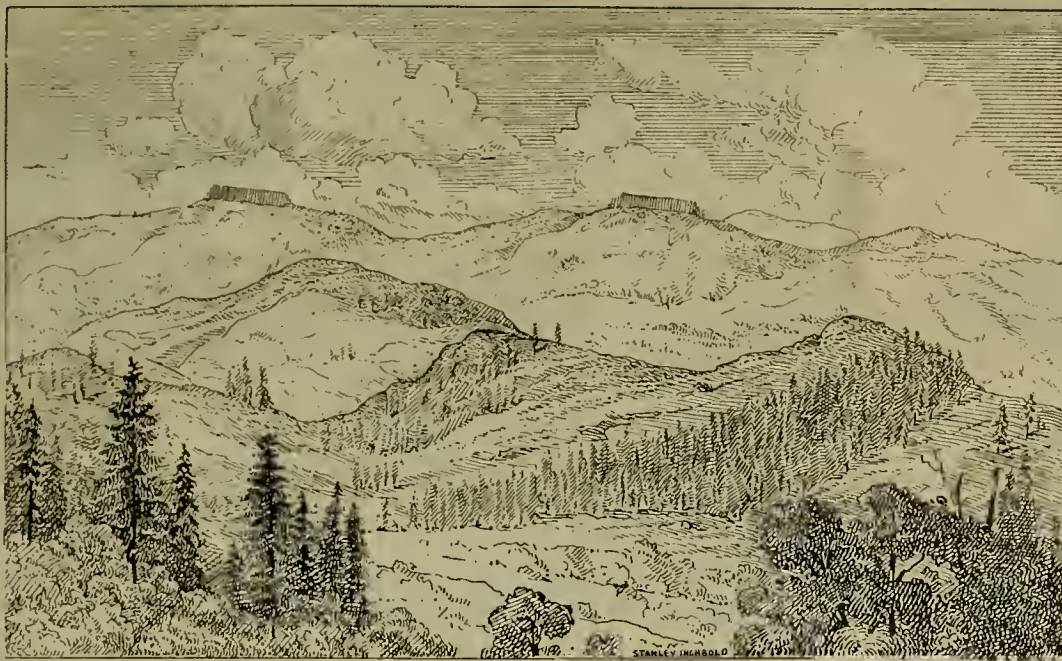
In response to a request made by the American Society of Civil Engineers, a committee has been appointed by the Technical Society of the Pacific Coast (as mentioned elsewhere in the PRESS) to make arrangements to cause minute observations to be made of the movements of the dam as pressure may be gradually relieved or applied.

The American Society of Civil Engineers has requested the company owning the dam to afford facilities to enable this unique opportunity to be properly availed of, asking them, in default of other engineers offering to do so, to themselves cause observations to be made by some competent observers. The practical data obtained by this proposed investigation will be of the greatest use to engineers all over the world.

SOUTHERN PACIFIC CO.—Senator Leland Stanford has retired from the presidency of the Southern Pacific Co., and C. P. Huntington has been elected in his stead. The other officers are: Charles F. Crocker, first vice-president; A. N. Towne, second vice-president; J. C. Stubbs, third vice-president; G. L. Lansing, secretary and controller; Timothy Hopkins, treasurer; N. T. Smith, assistant treasurer; C. F. Krehs, assistant secretary. Directors—C. P. Huntington, Leland Stanford, Chas. F. Crocker, Thos. E. Stillman, Thos. H. Hubbard, A. N. Towne, J. C. Stubbs, E. H. Miller, Jr., S. T. Gage, W. V. Huntington, W. E. Brown. Executive Committee—Leland Stanford, chairman; C. P. Huntington, Chas. F. Crocker, Thos. H. Hubbard.

THE STRIKE.—The Foundrymen's Association brought more molders from the East this week, and though some deserted on arrival, others are at work in the shops. The strikers still hold out, but the gradual filling up of the shops by imported men is weakening those who are "out." More men are expected from Philadelphia, Glasgow and Belgium. The shops are slowly but surely getting their complement of men.

THE QUARTZ MILLS of Montana number 48, 5 of which are in Beaverhead county, 15 in Deer Lodge, 7 in Jefferson, 5 in Lewis and Clarke, 4 in Madison and 12 in Silver Bow. Their gross output was, last year, \$24,012,000, divided as follows: Deer Lodge, \$3,604,000; Lewis and Clarke, \$1,333,000; Silver Bow, \$19,025,000. The average wages paid in these mills are \$3.45 per day.



VIEW FROM LAPORTE, LOOKING TOWARD MT. FILLMORE.—See page 249.

The Solar Corona.

Prof. Schaeherle's "Mechanical Theory."

The abstract printed below and the accompanying (a reproduction of the lantern slide used to illustrate his lecture) set forth the leading features of a new "mechanical" theory of the solar corona, which was explained to the members of the Pacific Coast Astronomical Society at its last meeting by Prof. J. M. Schaeherle of the Lick Observatory.

It was not in the least difficult for the members of the association to realize that the paper presented by Prof. Schaeherle was of extreme importance, and that it apparently solved all the mysteries attending the coronal appearances in a simple yet perfectly satisfactory manner.

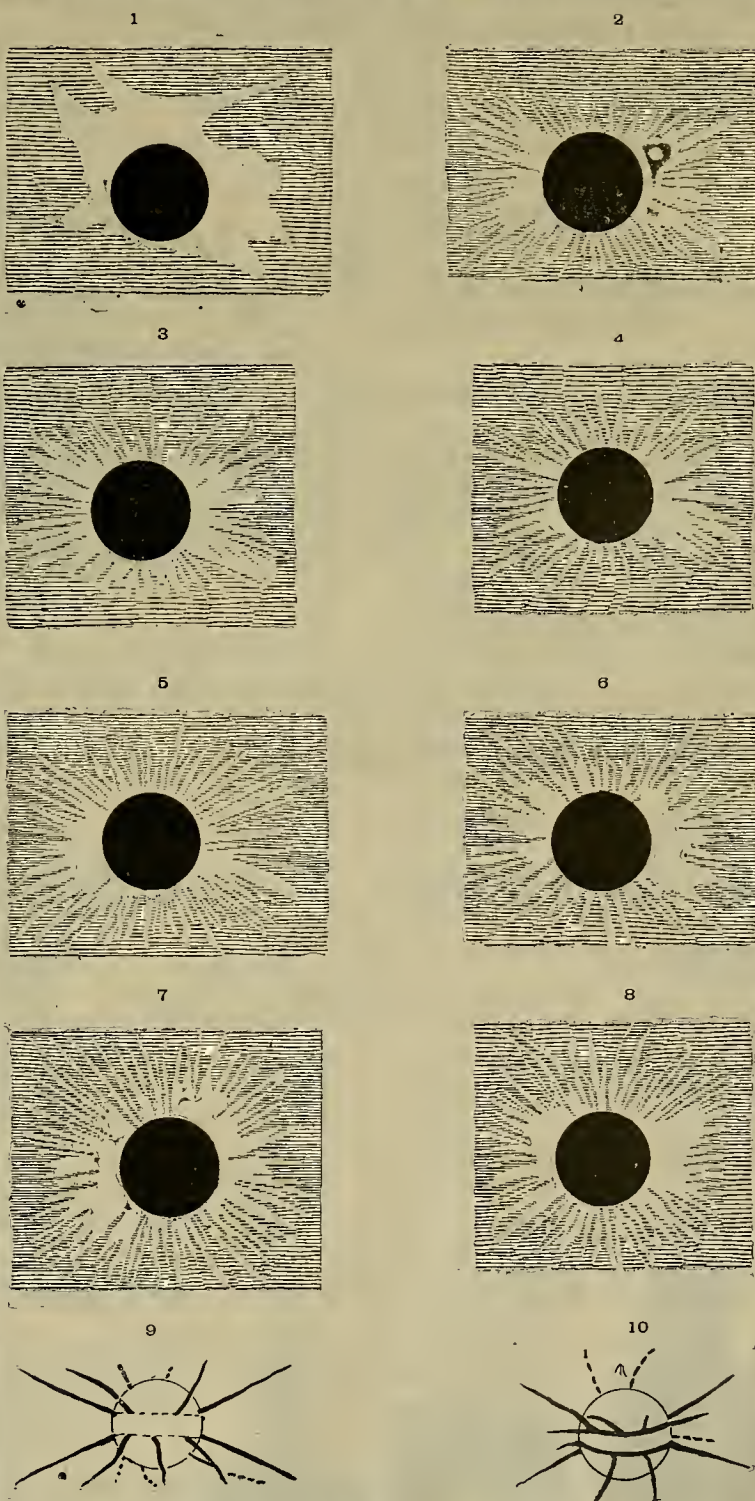
Prof. J. M. Schaeherle's paper was entitled "A Mechanical Theory of the Solar Corona." It stated that his investigations seemed to prove conclusively that the solar corona is caused by light emitted and reflected from streams of matter ejected from the sun by forces which, in general, act along lines normal to the surface of the sun; these forces are most active near the center of each sun-spot zone.

Owing to the rotation of the sun, the streams of matter will not lie along normals, since the angular velocity of different portions of the stream grows less as the distance from the sun increases; in other words, the streams are double curvature. Each individual particle of the stream, however, describes a portion of a conic section which is a very elongated ellipse so long as the initial velocity is less than 353 miles per second (assuming that the sun's atmosphere, as shown by various observations, is exceedingly rare).

The variations in the type of the corona admit of an exceedingly simple explanation, being due to nothing more than the change in the position of the observer with reference to the plane of the sun's equator. According as the observer is above, below, or in the plane of the sun's equator, the perspective overlapping and interlacing of the two sets of streamers cause the observed apparent variations in the type of the corona.

Prof. Schaeherle then exhibited a model, in which the sun is represented by a ball about an inch in diameter from which radiate a number of needles, to represent the streams of matter. All these needles are contained between two zones corresponding to 30° of latitude. The longer ones are most numerous near the middle of each zone, and slightly more inclined to the normal than shown in the shorter ones, in order that the more distant portions of the needles (representing the outgoing streamers) shall have directions roughly the same as required by physical laws. Eight photographs of the model, representing the various types of the corona, were also shown, and these are reproduced in the accompanying cuts.

When the model is placed in a beam of parallel rays and its shadow allowed to fall upon a screen, the slightest change in the posi-



FIGURES ILLUSTRATING MECHANICAL THEORY OF THE CORONA.

tion of the model produces an entirely new image.

Mr. Schaeherle stated that he had thus far been unable to find a single observed phenomenon which could not be accounted for by this mechanical theory.

A discussion of the theory and a comparison showing the remarkable agreement with observation will appear in the report of the eclipse of Dec. 21, 1889.

Concisely stated, the changes in the corona studied by the Lick astronomer have been from month to month, and not—according to the former custom—according to some cycle of years. Professor Schaeherle has pointed out that the December-January eclipses will show similar coronæ; and that the April-May and the August-September eclipses will be radically different in appearances. Then, constructing his model according to the principle that the "streamers" will be longest and most numerous near the centers of each sun-spot zone, he goes on to study the appearances presented by the different cross-sections of this model as observed at various angles above and below the plane of the sun's equator. These changes will all recur within the space of one year.

In the diagrams, one and two represent the appearance when the earth is nearly in the plane of the sun's equator; three and four, one month from that "node;" five and six, two months, and seven and eight, three months from the node; nine and ten are explanatory of the varying perspective shown by the individual streamers.

Prof. Schaeherle is a well-known American astronomer, who came to the Lick Observatory from Ann Arbor, Mich. His principal work has been in connection with the Meridian Circle, but he is also known in the annals of astronomy as the discoverer of two comets (by means of telescopes constructed with his own hands), and also as the author of many mathematical papers in the "Astronomische Nachrichten," etc. His work at the Lick Observatory has shown him to be a keen observer and an investigator of the highest rank. It is highly probable that his new theory is the first step toward an entire solution of this much-vexed question regarding the solar surroundings.

The Deep Gold Placers of California.

(Continued from page 249.)

As soon as the drift reaches gravel, it is heavily timbered, even if this was not necessary before. As the work progresses, the bedrock exposed in the tunnel is cleaned up from time to time and prospected. When the work has been continued for a time upstream in the channel, cross-drifts are cut at right angles, and a series of squares is thus blocked out. Breasting then begins, the gravel is stopped out, the large boulders piled up, and only the earth known to be auriferous taken out to be washed. As the stopping progresses, the roof is supported by heavy timbers and the space is filled by refuse boulders. After the tunnel is finished, the gravel is taken out as coal is mined in a flat or nearly horizontal vein. The bottom of the working tunnel is kept in bedrock for two reasons: first, to serve as a drain, and second, that the top of the ear may be near the surface of the bedrock for convenience in filling.

This is the method in most drift mines. In exceptional cases the gravel is cemented and changed to a hard conglomerate; this must be blasted out; few if any timbers are then required. Instead of washing as in the former instance, the auriferous gravel is disintegrated in cement-mills or crushed like quartz in an ordinary stamp-mill.

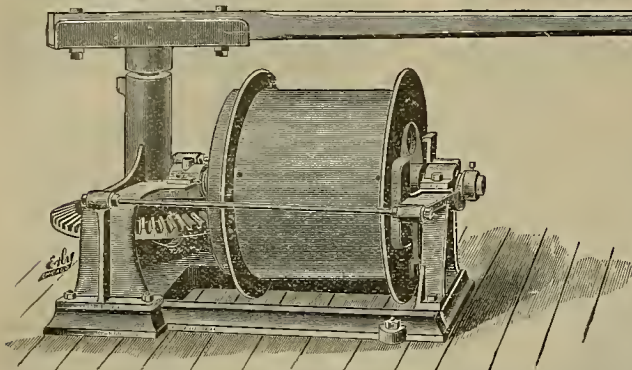
When the gravel is loose, it is dumped from the cars into a "V"-shaped chamber and a powerful stream of water turned on. The lighter particles flow with the water through riffled sluice-boxes, from which the gold is collected at periodical cleanups. One man can wash the gravel taken out by 75 men.

The hydraulic stream is thrown in such a manner as not only to disintegrate the gravel but also to force it against the strong hulkheads, from which it returns with the rebound of the water and passes the nozzle in its way down the sluices. This operation causes great agitation, during which the gold falls below the earthy matter and is arrested by the riffles; boulders too large to be washed down the sluices are taken out by hand and thrown aside.

STEWART MINING BILL.—A letter written by John Dare Emersley to the San Francisco Mining and Scientific Press of March 29th and April 5th, on the "Stewart Mining bill," headed "A Defective Measure Criticized," should be carefully read and digested by every mine-owner in the land.—Eureka Sentinel.

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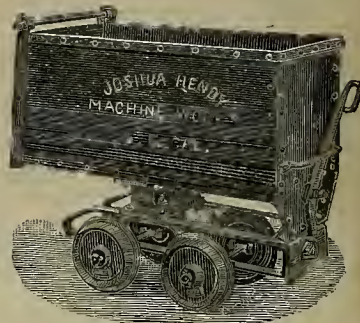
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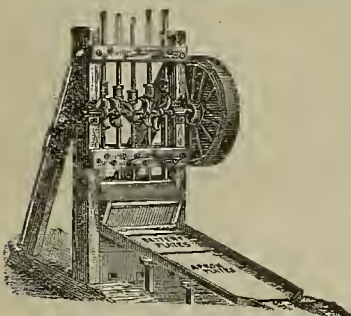
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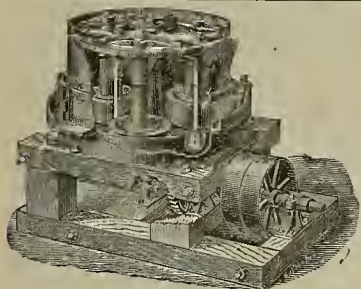
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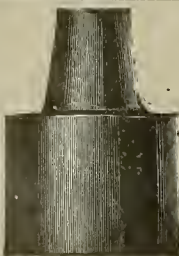
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LEAD PIPE,

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Under Chamberlin Patent.

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Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Agents for the Morgan Crucible Co., Battersea, England. Also for E. G. Denniston's Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices. Our Illustrated Catalogue and Assay Tables sent free on application.

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Ores worked by any Process,
Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.
Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

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No imitation, no deception, no palmed or rotten iron used. Only genuine Russia iron in Quartz Screens. Plashed iron screens at nearly half my former rates.

I have a large supply of Battery Screens on hand suitable for the Huntington and all Stamp Mills, which I will sell at 20 per cent discount.

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Free Coach to the House
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Affords the Most Simple and Reliable Power for all Mining and Manufacturing Machinery. Adapted to heads running from 20 up to 2,000 feet. From 12 to 20 per cent better results guaranteed than can be produced from any other Wheel in the Country.

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Power from these Wheels can be transmitted long distances with small loss, and is now extensively used in all parts of the country for generating both power and light.

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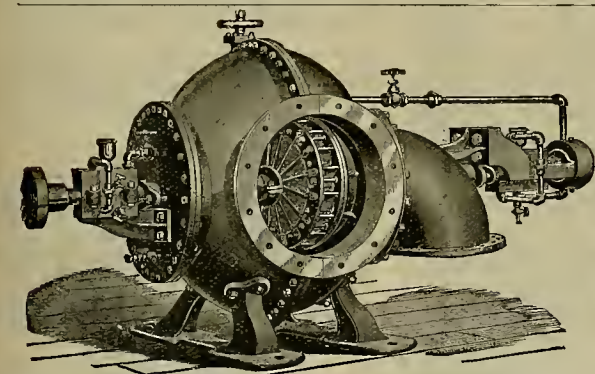
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PELTON WATER MOTORS.

Varying from the fraction of 1 up to 15 and 20-horse power. Unequaled for all light-running machinery. Warranted to develop a given amount of power with one-half the water required by any other. SEND FOR MOTOR CIRCULAR. ADDRESS AS ABOVE.

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These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

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Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

MARKET REPORTS.

Local Markets.

SAN FRANCISCO, April 10, 1890.

The past week has been fairly active in all branches of trade. It was generally expected that as interior roads improved, an increase in the volume of goods going out on distributive orders would be looked for.

The iron-molders' strike continues to interfere to some extent with foundry work, but, judging from present advices, the strikers will soon have to acknowledge themselves defeated, when business in that branch of trade will resume its normal condition, and upon a much more satisfactory basis.

The money market continues to show ease under freer remittances from all points on this coast, and also by more money placed in circulation in this city. Building and all other outdoor work is being vigorously pushed, giving employment to idle men, necessitating large disbursements of money. This, together with the promise of good crops and an active mining season, inspires confidence in the future, which is well calculated to promote speculation and an active money market later on.

MEXICAN DOLLARS—The market begins to show more strength. The demand from China ought to set in soon. The market is quoted at 75½ @ 75¾ cts. Exports last month were \$494,065 to Hong Kong and \$40,000 to Japan.

SILVER—The market at the East and abroad has gained in strength. This usually obtains with the India wheat crop coming in on the market. The quantity of Indian Council bills will be less than were placed last year, which should have its influence on silver. The conviction gains ground that the present Congress will pass a silver bill which will give free coinage in the near future. With the bullion piled up in the treasury vaults, it will always be a menace to European countries, and consequently they will not remonetize silver; but with free coinage in this country the remonetizing of silver by European countries will soon follow, for the minds of leading financiers at home and abroad are being disabused of the old threadbare mining-stock speculation cry when the manipulators have stock to sell, of "We are going to uncover a hidden bonanza on the Comstock." It is a well-established fact that the Comstock ore is running largely to gold, and no big bonanza like those of former days is likely to be uncovered, all stock speculators' reports to the contrary. With gold on the Comstock, silver ought to be favorably influenced, even without legislation. The silver bill will come up in Congress next Tuesday. The action of the committee having in charge the recoinage of worn or mutilated subsidiary silver coin, in reporting in favor of the National banks counting the silver a part of the reserve, is a step in the right direction.

The local silver market has been strong at 96 cts., with the Mint and exporters buying. The latter paid, in two instances, an advance on 96 cts. Yesterday (Wednesday), while the Mint's counter price was 96 cts., a sale was made direct to the Department at 96½ cts. To-day the market is very strong, with an advance obtainable. London cables came through at 44½d, and New York at 96½ cts.

QUICKSILVER—Receipts the past week aggregate 216 flasks. The receipts in last month aggregate 3493 flasks, and exports 792 flasks. The market continues strong, with a good home demand reported.

BORAX—The market is reported steady, with the Eastern demand not quite so urgent. Receipts the past week aggregate 445 cts.

ANTIMONY—The market continues bare of stock, causing nominal quotations. The East reports a firm market.

LIME—The home consumption is quite large, absorbing supplies upon receipt here. Receipts the past week aggregate 497 bbls., and exports by sea 600 bbls. to Honolulu and 150 bbls. to Hilo.

LEAD—The home demand is reported to be quite free. Receipts have been light. The market is steady. At the East, the market, after holding steady at the lower prices, is again gaining in strength. The European markets are reported weak.

COPPER—The market shows an unusually strong tone. At the East, supplies go into consumption at a good rate. The same remarks apply to Europe. The French stocks are reported to be reduced, owing to smaller quantities received from Chili and the United States.

TIN—The market for pig is barely steady. For plate the market is unchanged. Canners are reported to be well supplied and not in want of immediate requirements. It is a disputed point as to the probable quantity that will be worked up this season on this coast. From present advices we incline to the opinion that it will prove larger than that of last year.

IRON—Imports the past week aggregate 100 tons from New York. The market is still lifeless, but bidders, as far as we can learn, are not pressing sales, preferring to wait the outcome of the iron-molders' strike. The stock here is large. Eastern advices report an improved demand. They also report more furnaces being erected in the Southern States, with the output there steadily increasing. English advices report more furnaces damped, which will restrict the output of hematites fully 20 per cent. Puget sound and Oregon are drawing quite freely from the local.

COKE—The local demand is slow. There is a fair inquiry from up North.

COAL—Imports the past week aggregate as follows: Departure Bay, 6860 tons; Seattle, 10,285; Tacoma, 2200; Coos Bay, 750; Sydney, 2350; Newcastle, N. S. W., 5318; total, 27,763 tons. Warm weather and free receipts of soft coals cause an easier tone for that grade, but bidders look for little or no concession unless the weather continues warm for two or more weeks. Hard coals are firm for spot, on passage, and to arrive. The tonnage at Australia to load for this port is still light. The consumption of steam coals shows an increase.

The Hawthorne Bulletin says that Wm. T. Coleman has sold his horax deposits at Death Valley, Inyo county, to San Francisco parties for \$400,000.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS

ASSESSMENTS.								
COMPANY.	LOCATION.	NO.	AM'T. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.	
Alabama M Co.	Nevada.	1.	3.	Mar 18.	Apr 22.	May 13.	W H Watson.	302 Montgomery St.
Alpha Cons M Co.	Nevada.	4.	10.	Apr 5.	May 16.	June 5.	C S Elliott.	309 Montgomery St.
Bechtel Cons M Co.	California.	11.	25.	Feb 10.	Mar 17.	Apr 13.	C C Harvey.	303 California St.
Bailey M Co.	Nevada.	1.	8.	Mar 13.	Apr 22.	May 13.	W H Watson.	302 Montgomery St.
Butte King M Co.	California.	1.	30.	Feb 13.	Mar 20.	Apr 12.	W O Lewis.	172 Market St.
Confidence S M Co.	Nevada.	15.	75.	Mar 12.	Apr 16.	May 7.	A S Groch.	414 California St.
East Best & Belcher M Co.	Nevada.	1.	25.	Feb 11.	Mar 14.	Mar 31.	C H Mason.	331 Montgomery St.
Eureka Cons Drift M Co.	California.	1.	3.	Feb 24.	Apr 5.	Apr 28.	W H Rabe.	224 Montgomery St.
Hale & Norcross M Co.	Nevada.	15.	50.	Apr 9.	May 15.	June 5.	A B Thompson.	309 Montgomery St.
Harford M Co.	Nevada.	7.	2.	Apr 8.	May 15.	June 6.	J Hermann.	303 California St.
Happy Valley Bl. Gravel Co.	California.	1.	5.	Feb 12.	Mar 24.	Apr 14.	D M Kent.	330 Pine St.
Holmes M Co.	Nevada.	11.	25.	Mar 16.	Apr 17.	May 8.	C E Elliott.	309 Montgomery St.
Humboldt M Co.	Nevada.	1.	8.	Mar 15.	Apr 22.	May 13.	W H Watson.	302 Montgomery St.
Indian Creek M Co.	California.	1.	10.	Mar 12.	Apr 14.	May 14.	S C Mills.	419 California St.
Martin White M Co.	Nevada.	23.	25.	Feb 12.	Mar 31.	Apr 30.	A B Cooper.	325 Montgomery St.
Maxflower Gravel M Co.	California.	46.	50.	Mar 8.	Apr 10.	May 1.	J Morizio.	328 Montgomery St.
Ophir M Co.	Nevada.	11.	25.	Mar 12.	Apr 17.	May 3.	O S Elliott.	309 Montgomery St.
Peerless M Co.	Arizona.	5.	10.	Mar 28.	Apr 30.	June 9.	A Waterman.	308 Montgomery St.
Peabody G M Co.	Nevada.	34.	50.	Mar 27.	Apr 30.	May 2.	C E Elliott.	309 Montgomery St.
Quaker G M Co.	California.	18.	20.	Mar 8.	Apr 5.	May 5.	A Cheminant.	323 Montgomery St.
Standard Cons M Co.	California.	2.	25.	Mar 4.	Apr 14.	May 19.	J W Pew.	310 Pine St.
Union Cons M Co.	Nevada.	40.	25.	Mar 8.	Apr 10.	Apr 30.	J M Buffington.	308 California St.
Utah Cons M Co.	Nevada.	9.	25.	Mar 11.	Apr 17.	May 6.	A H Fish.	309 Montgomery St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING DATE
Baltimore S M Co.	Nevada.	A K Grim.	402 Montgomery St.	Annual. Apr 13
California Iron & Steel Co.	California.	F Bonadici.	38 California St.	Annual. Apr 21
Carbon Coal Co.	Nevada.	E G Knapp.	407 California St.	Annual. Apr 17
Gardiner Mill Co.	Nevada.	C C Stevenson, Jr.	22 California St.	Annual. Apr 14
Guasacaran and California M Co.	California.	E Oliver.	26 Montgomery Ave.	Annual. Apr 17
Live Oak Drift Gravel Co.	California.	J Morizio.	328 Montgomery St.	Annual. Apr 15
Derbez Blue Gravel M Co.	California.	F Watzel.	102 California St.	Annual. Apr 22
Russell Reduction & M Co.	California.	J Morizio.	323 Montgomery St.	Annual. Apr 21

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Champion M Co.	California.	T Watzel.	322 Montgomery St.	10.	Jan 20
Candelaria Cons M Co.	Mexico.	G Gato.	303 Montgomery St.	25.	Apr 5
Caledonia M Co.	Nevada.	A S Cheminant.	328 Montgomery St.	98.	Apr 1
Con California & Va M Co.	Nevada.	A W Havens.	309 Montgomery St.	25.	Feb 19
Derbez Blue Gravel M Co.	California.	F Watzel.	102 California St.	2.	Dec 23
Idaho M Co.	California.	J Morizio.	Grass Valley.	2.50.	Mar 27
Mt Diablo M Co.	Nevada.	R Heath.	319 Pine St.	30.	Oct 21
Pacific Borax Salt & Soda Co.	California.	A H Clough.	230 Montgomery St.	1.00.	Feb 10

Mining Share Market.

The past week has witnessed renewed activity in the mining share market, with Potosi and Chollar still in the lead. The actions of these two stocks are such as to give to close observers greater confidence in the market. Those in position to know affirm that this is a growing market with setbacks, and perhaps at times, decided breaks, particularly in the leaders. The general public are doubting Thomas, still adhering to the opinion that prices must go quite low before there is much in them. There is one thing that cannot be denied, viz., that every share of stock thrown at the pool is not only taken, but bids are made for more. In 1886 the North End stocks had a deal, the next year the Confidence-Challenge group, and now it looks as if the Chollar-Potosi group is to have a deal. In the outside stocks there is nothing doing, but toward the close, higher prices are bid for Bodie—as if the Bodie sharps are after some of the "chicken pie" so as to continue assessments.

The return of Col. Mackay to Virginia City, it is claimed, is due to an improvement in Union, and also to observe closely the work going on in Best and Belcher and Ophir. Others, again, think his object is to get up a move in the stocks so as to sell out and then go to New York City to live.

Hon. Francis G. Newlands, who is supposed to control the Gold Hill mines, will be on the Comstock the last of this month—just about the time they are ready to put the pumps in Crown Point so as to pump out the mines.

From the Comstock mines our advices report them in rich ore on the 1300-foot level of Con. Virginia, which they are stopping out. In Union they have run into ore, but the particulars are withheld. In Ophir and Best and Belcher important work is being done. The assessing of Hale and Norcross is considered by many to be an outrage on shareholders. The assessment is levied in the face of a reported rich ore development from the 1200-foot level down. In Andes, more work has been and is being done under the present management than for many years previous. The winze in Potosi continues to show well. A drift is being run through Bullion to tap the downward continuation of the ore found in the winze and upraise. In Julia, more work is being done. In Alpha, they ought soon to begin to make favorable reports of the 600-foot west crosscut. In Con. Imperial they are running a drift or crosscut so as to cut the downward continuation of the ten feet of ore found near the Challenge line. After the crosscut is advanced a little further, an upraise will be started. The joint Confidence-Challenge upraises on the 300 and 500 foot levels are in ore. In Yellow Jacket they have stopped work on the 500-foot west crosscut so as to allow the water to run off. Work will be resumed as soon as they can handle the water. Crown Point's official letter received this week reports still higher battery assays, and states that in the winze being sunk below the 300-foot level they are in good ore. The old 230-foot level west crosscut is being opened so as to advance the crosscut to a point above the 300-foot level west stopes.

From the outside mines there is nothing of particular interest to report. The suit of some of the shareholders of the Kentucky Mining Co. against Gov. Stevenson for an accounting has been compromised. The amount of money that the Governor will pay to the stockholders, we are not able to learn at this writing, but it is intimated that it will give a handsome dividend to them.

Eastern Metal Markets.

By Telegraph.

NEW YORK, April 10, 1890.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday....	43½	95½	\$14 30	\$3 87½	\$20 10
Friday.....			14 30	3 87½	20 10
Saturday.....			14 30	3 87½	20 10
Sunday.....			14 30	3 87½	20 10
Tuesday....	44	96	14 50	3 90	20 00
Wednesday..	44	96	14 50	3 90	20 00

NEW YORK, April 8.—Borax is slower, but the tone appears to be steady. Quicksilver is steady. Lead is a shade stronger under a fair demand. Tin is lower, but closed with a steadier tone. Copper is quite strong under lessening supplies and a good demand.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Mar. 20.	WEEK ENDING Mar. 27.	WEEK ENDING Apr. 3.	WEEK ENDING Apr. 10.
Alpha.....	.89	.85	1.10	1.00
Alta.....	1.15	1.24	1.10	1.15
Andes.....	.40	.48	.40	.55
Belcher.....	1.45	1.60	1.40	1.80
Best & Belcher.....	2.50	2.60	2.60	2.80
Bullion.....	.50	.58	1.00	1.10
Bodie Cons.....	.45	.50	.45	.50
Bullwer.....	.15	.20	.20	.20
Commonwealth.....	2.55	2.85	2.60	2.80
Con. Va. & Oal.....	4.15	4.50	4.15	4.85
Challenge.....	1.40	1.40	1.90	1.25
Chollar.....	2.00	2.25	2.10	2.90
Confidence.....	2.75	3.00	2.75	3.00
Con. Imperial.....	.30	.35	.35	.40
Caledonia.....	.15	.20	.15	.25
Derbez Blue Gravel.....	.30	.35	.30	.35
Dredger.....	.30	.35	.30	.35
El Monte.....	.80	.95	.90	1.05
Eureka Cons.....	.30	.35	.30	.35
Excelsior.....	.45	.50	.45	.60
Gold & Silver.....	.50	.55	.50	.55
Gould & Curry.....	1.30	1.35	1.50	1.60
Hale & Norcross.....	2.25	2.45	2.30	2.80
Julia.....	.30	.35	.30	.40
Justice.....	1.25	1.30	1.35	1.70
Kentucky.....	.30	.35	.30	.35
Lady Wash.....	.30	.30	.30	.30
Mono.....	.30	.30	.30	.30
Mexican.....	2.30	3.10	2.55	3.20
Navajo.....	1.00	1.05	1.00	1.10
North Belle Isle.....	1.00	1.05	1.00	1.10
Nev. Queen.....	.70	.75	.75	.80
Occidental.....	.90	.95	.80	1.00
Ophir.....	3.75	3.95	3.70	4.10
Overman.....	.85	.95	1.05	1.40
Potosi.....	1.80	2.20	2.00	2.40
Peerless.....	.16	.20	.20	.20
Petr.....	.20	.20	.20	.20
Savage.....	1.45	1.55	1.50	1.80
S. B. & M.....	1.20	1.35	1.00	1.75
Sierra Nevada.....	2.00	2.10	2.00	2.30
Sierra Hill.....	.30	.30	.30	.30
Scorpion.....	.15	.25	.25	.20
Union Cons.....	2.05	2.20	2.10	2.50
Utah.....	.45	.50	.50	.50
Yellow Jacket.....	1.90	2.00	2.00	2.20

Sales at San Francisco Stock Exchange.

THURSDAY, Apr. 10, 9:30 A. M.	770 Hale & Norcross.....	3.05
	100 Holmes.....	.25
	300 Alta.....	.40c
	300 Alpha.....	.35c
	200 Baltimore.....	2.50
	500 Belcher.....	1.00
	200 E. & Belcher.....	1.00
	100 Belle Isle.....	3.95
	300 Bonanza.....	.40c
	2300 Bullion.....	.60c
	600 New York.....	.35c
	550 Challenge.....	1.00
	1200 Chollar.....	1.25
	100 Commonwealth.....	1.10
	115 Confidence.....	.50c
	600 Crown Point.....	5.00
	135 Con. Imperial.....	6.37½
	700 Con. Cal. & Va.....	2.95
	300 Delmont.....	1.40
	100 E. S. Nevada.....	2.40
	400 Excelsior.....	7.50
	300 Grand Prize.....	.75c
	500 G. & C.....	.45

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It has only to be seen to be admired, consulted once to secure a patron who remains a regular subscriber. Great care is taken to confine the names given in the lists to desirable firms, only the most substantial business houses being inserted in conspicuous capital letters that are the only distinguishing mark of "paid matter," there being no display advertisements, side-lines or corner-cards to interrupt the classified lists, attract the attention of the user or mar the typographical beauty of this page.—S. F. Examiner, March 25, 1890.

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C. J. WARD—San Bernardino Co.
W. W. THORNTON—Los Angeles Co.
E. H. SONARFFLE—Amador and Tuolumne Cos.
FRANK S. CHAPIN—Colusa and Tehama Cos.
ISAAC AYER—Fresno, Cal.
W. B. FROST—Humboldt Co.
GEO. WILSON—Sacramento Co.
T. M. STARKUS—Sierra Co.
H. KELLEY—Modoc Co.
W. H. HILLMAN—Oregon.
E. E. DENING—Oregon.
CHAR. M. MOODY—Oregon.
H. G. PARSONS—Washington.
T. J. MAY—Washington.
R. G. HUSTON—Montana.
E. B. TAFT—San Joaquin Co.

Bullion Shipments.

We quote shipments since our last and shall be pleased to receive further reports:

Consolidated California and Virginia, April 5, \$50,549; Savage, 5, \$28,091; Justice, 5, \$5298; Cons. California and Virginia, 9, \$56,147. Total for March account, \$246,148; Mt. Diablo, 9, \$9056.

Attention, Southern California Miners.

WORKS FOR SALE.

The Works are situated at Daggett, Cal., in the Calico Mining District, and on the side-track of the Atlantic and Pacific Railroad. They contain a first-class 50-horse power Engine and 45-horse power boiler, with Ore Crusher and other machinery, Mill Scales, Assaying Outfit, etc., all nearly new. Also upon the premises an office building and a comfortable dwelling-house (portable). The above can be had at a bargain. Apply to GILLISPY & CHILDS, 123 California St., San Francisco.

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Notice is hereby given, that at a meeting of the Board of Directors, held on the 20th day of March, 1890, an assessment, No. 10, of 3 cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 11, No. 303 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of May, 1890, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, THE 9th DAY OF JUNE, 1890, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

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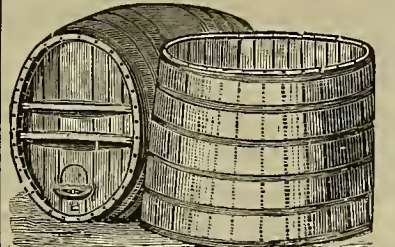
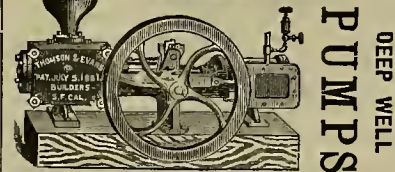
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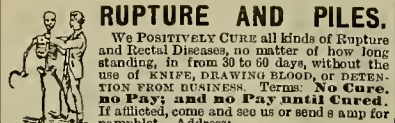


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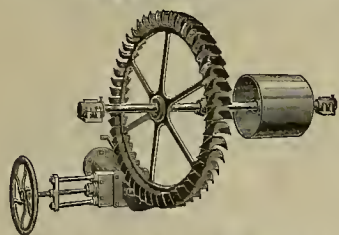
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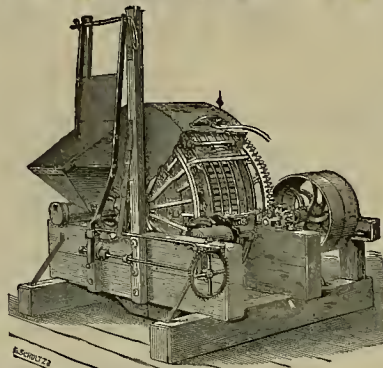
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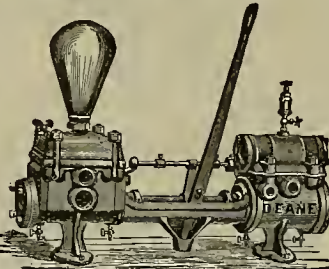
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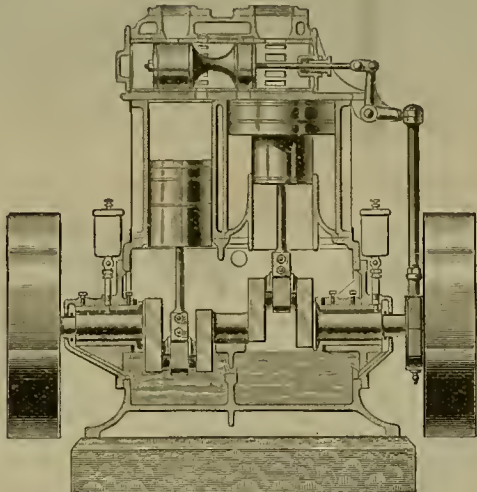
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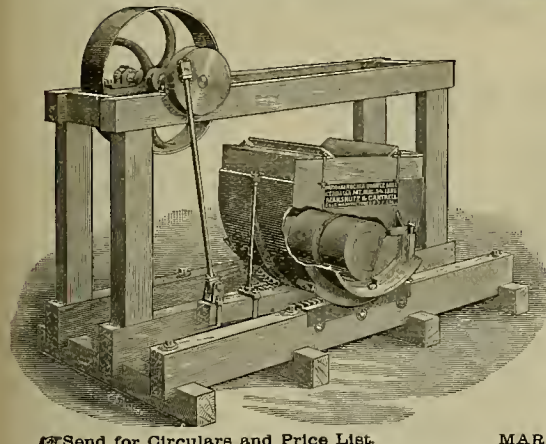
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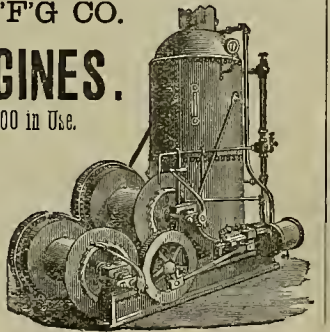
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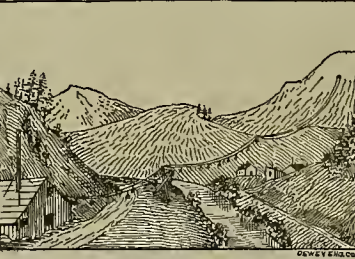
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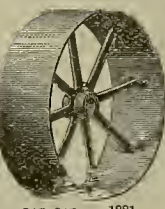
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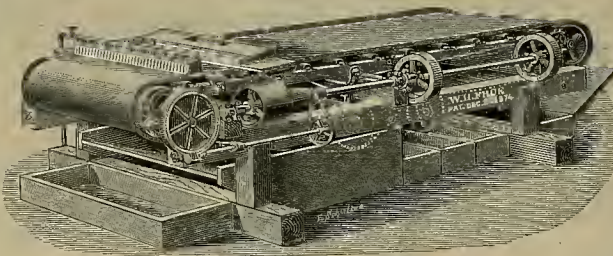
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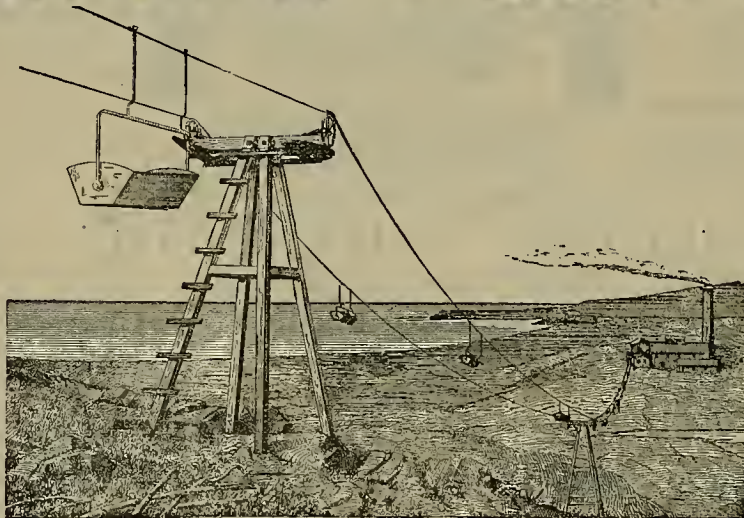
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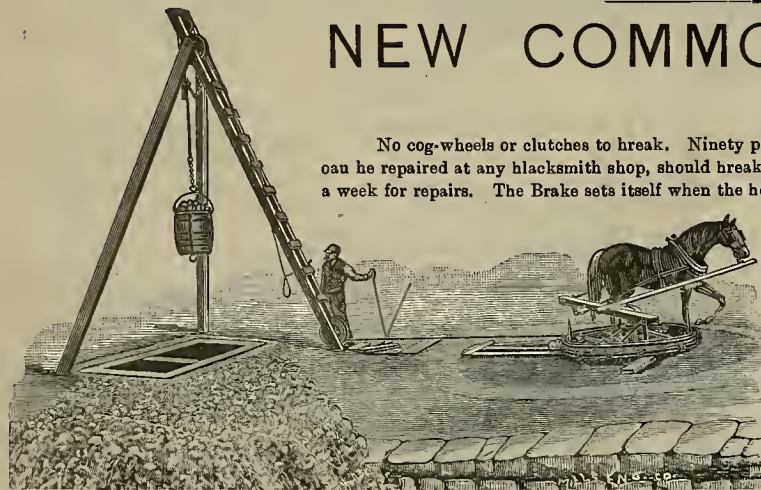
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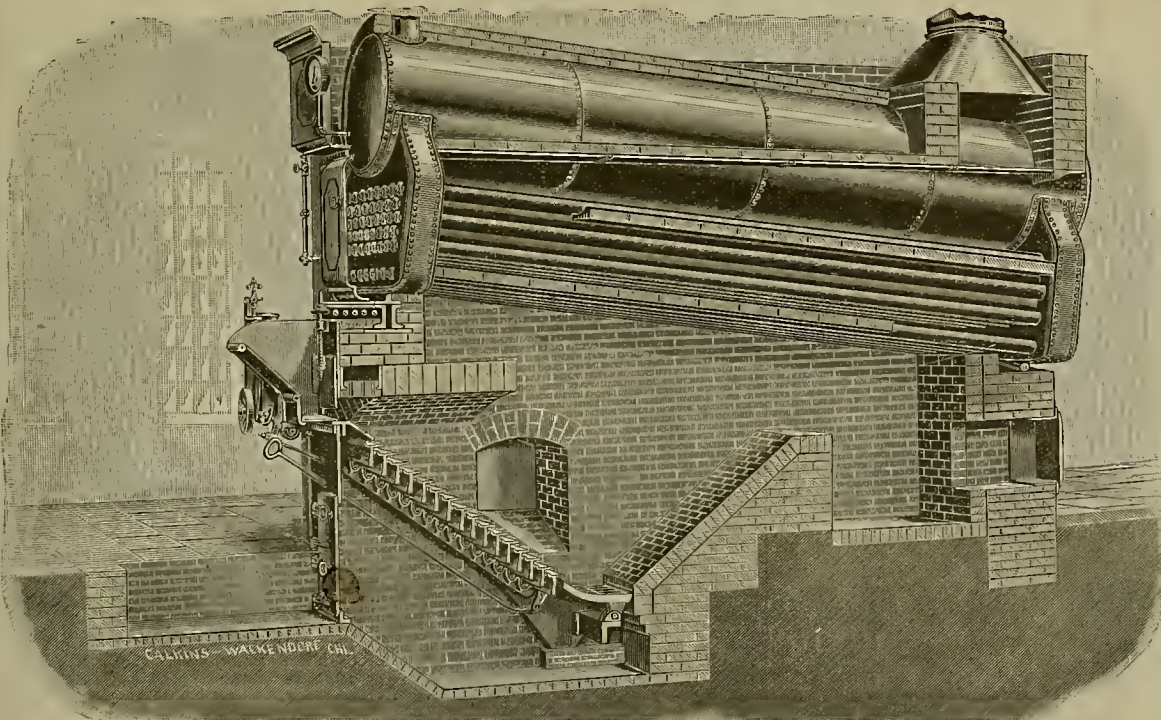
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SAN FRANCISCO, SATURDAY, APRIL 19, 1890.

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THE TEMPLES AND TOWERS OF THE VIRGEN, GRAND CANYON OF THE COLORADO.—See page 270.



SETTING OF 150-HORSE POWER HEINE BOILER WITH MECHANICAL STOKER.

Mechanical Feed for Boiler Furnaces.

On this page is an engraving of a 150-horse power Heine boiler, equipped with the Roney mechanical stoker. This boiler has a great reputation as a cheap and efficient generator of steam, and when fitted with a mechanical stoker, will successfully burn low-grade fuel, so that the cost of evaporating a pound of water into steam is materially reduced. The California Engineering Co. of this city is rapidly introducing this mechanical stoker into use on this coast. By means of this device, slack screenings, etc., may be burned without trouble, greatly reducing the cost of making steam. The machine feeds the fire with great regularity and the rocking motion of the grates prevents any caking. The application of the stoker to the remodeling of existing boiler plants is quite easy, as the stoker itself is independent of the masonry of the boiler setting.

The prospectors into the Carriso mountains on the Navajo Reservation have returned to Albuquerque, N. M., with stories of the wonderful richness in gold and silver of that section, and the ease with which the mineral can be secured, Nature providing plenty of water and timber. An effort will be made to have the district detached from the reservation.

The New England Society of California Pioneers left Boston on the 10th for a visit to California. It is the intention of the party to make trips to many of the old mining camps and towns of the State.

The Deep Gold Placers of California.

NUMBER III.

[Written for the Press and Copyrighted 1890, by HENRY G. HANES, F. G. S. A., F. G. S.]

The Deep Channels.

The ideal deep-lying auriferous channel is quite different from the real one. The ideal is a rocky trough with smooth sides and a uniform rimrock, the real one is an elongated basin scooped out of the bedrock, of varying width and depth, with an uneven and extremely rough bottom.

Such channels are uncovered in hydraulic mining but never in drifting. In the latter case they are only seen by the dim light of candles; in the former, exposed to the broad sunlight, they may be minutely examined. They are not synclinal troughs or folds, but cut channels too wide to be the work of rivers and frequently too flat to have been the beds of rapid streams. The late Mr. W. A. Skidmore thus described them as seen by him:

"These ancient channels are sinuous in their course, and have many branches and tributaries. Their grades vary from 20 to 300 feet per mile, sometimes confined within narrow banks, and again assuming lacustrine proportions."

"The San Juan Ridge at North Bloomfield has a channel about 200 feet wide on the bottom and 800 feet wide at the surface. The company own about 19,000 linear feet of the channel, which has been continuously worked since 1853."

"* * * The channel on which the Bloomfield and Milton Companies are operating has been opened in so many places that its position has been accurately determined and its contents approximately ascertained. Within the limits of the San Juan Ridge alone, in the county of Nevada, it is known that there remains to be extracted about \$90,000,000. In other portions of the county the position of the gravel channels is not at present so well known. It is, however, known that they exist for many miles in length."

While gravel channels have the same general character, they differ in detail. An accidental depression in the rimrock, explored by a bore-hole, may be mistaken for the bottom, in which case driving for it would result in disappointment and financial loss. The most skillful engineering will not insure connecting with the bottom of the channel by a drift, because there are unseen irregularities which cannot be allowed for. This may be understood by examining the channels of mines exposed by hydraulic mining.

Channel Filling.

The deep placer channels of California are filled with gravels having a varying thickness of from 20 to 400 feet. Large boulders generally lie on the bedrock. They are not of uniform size, but range from the well known cobble used in paving city streets to masses of many tons weight. Stones of lesser size than those first mentioned are designated as gravel, coarse, medium, and fine—the latter down to a quarter of an inch in diameter. Less than this is called sand, also of many grades of fineness. When it passes through a 60 mesh sieve, it becomes silt, the finest of which remains in suspension for many days. As an illustration of this, I give the result of my experiments.

A sample of muddy San Francisco surface water was taken from a small pool on the hill, near my residence on Greenwich street, Jan. 1, 1886, after a heavy rain. It was set aside and closely watched. Not until March 20 (85 days after) did it settle perfectly clear. Feb. 9, 1888, a second experiment was made, the contents of the bottle were well shaken up; the next day a stratum of the heaviest particles had settled, but the liquid was otherwise unchanged. On the 15th, more had settled, but it was still opalescent and semi-opaque. March 18, it was still milky, but the extreme upper surface to a depth of two or three millimeters was clear; all below was translucent. April 17 (67 days), it was still slightly opalescent, but the sediment had practically settled. It is silt of this character that is referred to by Dr. Trask and Prof. Blake as quoted elsewhere. It bears the general name "pipeclay" among the California gold miners.

As a rule in these deposits, boulders diminish in size and gravel becomes smaller, while the proportion of sand and silt increases from the bedrock upward.

The following measurements, selected from many, show the thickness of gravels at different localities:

	Feet.
Cotton Mine, Grizzly Canyon	20
Todd's Valley	35
Smith's Point	50
Vaughn's Claim, Wisconsin Hill	55
Gopher Hill	240
Magara, Slate Creek	300
(Of which 100 is gravel.)	
Indiana Hill	400
Cherokee Flat	430
Gold Run, Blue gravel	150
Overlaid by red gravel	300-450
Blue Tent	650

There is a marked difference between the matter filling a hydraulic channel and that of a drift mine. As a rule, the latter is almost wholly quartz, blue in the channels at a high altitude, notably near Laporte, and white lower down as at or near Dutch Flat in Placer county; while boulders of diorite, granite and other rocks are not uncommon in the hydraulic mines.

The large boulders are rounded and smooth;

coarse gravel, too, is rounded; the finer gravels, on the contrary, are all angular. The condition of the sands and silts has been stated elsewhere. The pipeclay, which is a fine glacial mud, deposited in still water, is tough and plastic when wet; when dry it takes the form of lithomarge, and breaks with a conchoidal fracture. It often contains leaves unbroken and as perfect in form as when they fell on the placid surface of a lake.

While a general uniformity in these deposits has been shown, it is not to be understood that there is no sand or fine grits near the bedrock, or boulders far above, for the interstices of the bedrock boulders are so filled, and large boulders sometimes lie many feet above. An observer who stands in a deep cut made by hydraulic mining on a large scale, may notice on the high banks so formed, indications of stratification, but not such as may be seen elsewhere in the State, indurated to sandstone; he may see that this stratification is irregular and has the appearance of having been deposited by installments, in lenticular bodies rather than in parallel strata as might be expected. As the surface is reached, the stratification becomes more regular. There is no disputing the fact that a long period of quiet must have followed the glacial era in which the great boulders were deposited on the deeply channelled bedrocks.

Similar conditions existed in the deeper drift mines, but as they all lie under lava deposits, they cannot be examined except by bore-holes, and in the few vertical shafts sunk from the surface. The faces of the banks at the Polar Star Hydraulic mine in Placer county, as exposed by the hydraulic jets, are thus irregularly stratified from bedrock to surface; some portions are stained by oxide of iron; but the boulders, be they large or small, are all white quartz. At Gold Run, in the same county, the boulders are diversified in character, hornblende, porphyry and diorite being mingled with quartz.

The gravel in hydraulic mines is always loose and easily disintegrated, otherwise this mode of mining would be impossible. In drift mines, as a rule, it is also loose, but in some cases the boulders are cemented and thus changed to the hardest conglomerates, which must be blasted out and disintegrated in cement-mills, or even wholly crushed under heavy stamps, to recover the gold that exists under the same conditions as in the loose gravels.

It is in accordance with my theory to assume that the channel filling in the deep placers is wholly local; that all the constituents originally in the soft bedrocks were set free during the ice period and simply sank downward as the soft bedrock was cut away by the ice and glacial rivers. I have found in place within a radius of ten miles around Gibsonville, all the constituents of the channel filling, including the blue quartz which gives character and name to the deposits. The similarity between the Ohio boulder clays admitted to be glacial, as shown below, is too striking to be a coincidence.

The following is a tabulated view of the principal mineral composing rocks, and their associates, likely to be found in shallow placer mines, with relative hardness and specific gravity:

Name.	Hardness.	Specific Gravity.
Graphite	1.0	2.10
Talc	1.0	2.60
Gypsum	2.0	2.30
Chlorite	2.0	2.60
Gold	2.5	19.25
Serpentine	2.5 to 4.0	2.60
Mica	2.5	3.10
Calcite	3.0	2.70
Limestone	3.0	2.70
Brittle	3.5	4.48
Dolomite	3.5	2.90
Fluor spar	4.0	3.10
Platinum	4.5	17.75
Pyroxene	5.5	3.20
Agapetite	5.5	5.10
Hornblende	5.5	3.00
Nephelite	5.5	2.50
Scapolite	5.5	2.60
Muscovite	5.5	4.50
Leucite	6.0	2.50
Hematite	6.0	4.50
Cyanite	6.0	3.40
Feldspar, Orthoclase	6.5	2.50
Olivine	6.5	3.00
Epidote	6.5	3.50
Staurolite	7.0	3.80
Tourmaline	7.0	2.94
Feldspar, Albite	7.0	2.60
Quartz	7.0	2.60
Zircon	7.5	4.75
Diamond	10.0	3.50

The glacial till in Ohio (Geological Survey of Ohio, Vol. I) much resembles that of California. There was a period of glaciation in Clarke county, an intercalation of vegetable growth, and subsequent deposit of clay and gravel, and channels were eroded resembling ours. "The floor of the county is covered with tough, compact, blue clay filled with scratched pebbles and boulders, and containing tree trunks and vegetable remains 20 to 30 feet below the present surface." There is also a heavy accumulation of ochreous gravel.

Prof. Wright has figured ("Ice Age in North America," page 114) a stratified glacial deposit on Seven-mile creek near Hamilton, Ohio, which much resembles a hydraulic mine in California; and another on folio 284 so strikingly like our hydraulic banks that, by permission, I have introduced it here. (Fig. 5.) As it is taken by the photogravure process, it is exact to nature, and not as an artist would sketch it. It has the advantage, too, of showing the details more perfectly when somewhat magnified. Another on folio 340 could be duplicated by a camera in any of the hydraulic mines of this State.

A view of a similar glacial bank as exposed in the Blue Tent hydraulic mine in Nevada county, from a photograph by Watkins of San Francisco, is reproduced for comparison. (Fig. 6.) It was taken from a greater distance than in the case of the Ohio photograph, otherwise the similarity would be more marked.

At Wahoo near Portwine, Plumas county, the Laporte channel, the channel east of Canyon creek, and the Morristown channel run within a space of 18 miles and are nearly parallel; they are 500 feet wide. The gravel is from 50 to 300 feet deep. The grade is from 60 to 200 feet to the mile. The channel filling is composed of earthy matter from the finest silt to boulders having an estimated weight of 25 tons, some of them so large that it is cheaper to drive a tunnel through than to attempt to remove them.

Boulder clay (the pipeclay of the California miner) extends over the low grounds of North Germany, Denmark, Holland, Scandinavia, Scotland, and a part of England and Ireland.

According to Geikie, the silty snepended matter in the waters of the Rhine in July and August is angular.

At the Manzanita mine, near Nevada City, Nevada county, there are found on the bedrock some dark-colored howlders, much quartz sand, and some magnetic sand. The slickens from this mine contains mica scales resulting from the decomposition of the granite bedrock.

Channel-Filling—Boulders.

There are two ways in which boulders may be formed, the commencement in both cases being the same. Fragments are sundred from rock masses by the crushing weight of superincumbent earth; by the action of frost, by local pressure, landslides, earthquakes, volcanic eruptions, by the force of sea waves, by undermining oatacracts, by lightning, by change of temperature, by glaciers or still other causes.

The surface of a glacier is generally if not invariably covered with rock fragments torn from the earth by the power of the moving ice; these vary greatly in dimensions, ranging from huge masses to coarse sand.

These rocks frequently slip into crevasses and go to the bottom of the ice sheet; pass to the edges, forming lateral moraines, or move with the current and eventually drop on the terminal moraine. All the moraines of the Muir Glacier, Alaska, contain many large blocks of stone, one of which 20 feet square and about the same height was seen by Prof. Wright, as it stood on a pedestal of ice three or four feet high.

Those rock fragments which fall into the crevasses are rolled into howlders or ground to sand. When two glaciers meet, a medial moraine is formed by the blending of the two central laterals; much of the matter in this case goes to the bottom and is crushed on the bedrock which is itself deeply channelled thereby.

John Collett (Indiana Geol. Rep. 1876, Fol. 364), writing of Montgomery county and the glacial epoch in Indiana, thus accounts for the boulders in the drift: "The glacial surface was covered with angular fragments of rocks from overhanging cliffs at the north, and with sand and gravel. Such materials, absorbing the warmth of the short arctic summer, would gradually sink in their matrix, or falling through the numerous crevasses and water-ways would reach the bedrock, over which the glacier was advancing. The softer material would be ground in this giant mill to powdered clay and sand, while the more obdurate rocks would be rounded, polished and striated as gravel and boulders which we find so plentiful in this region."

The ground material under the glacier is called by the Swiss geologists "moraine profunde" or "grundmoraine"; by the English, "howlder clay," "till," or "bottom moraine."

The erosion which cuts the channel is caused by the grinding of the rocks which fall through the crevasses. These, if of hard material, do much work when held in the frozen grasp of the glacier, while soft matter soon becomes mud and is quickly washed away.

The sand and small pebbles so formed are invariably angular, while the sands of rivers and those on the seashore are rounded and smooth. The most indurated bedrocks are ground and polished as well as channelled. The elongated glacial channels frequently cross, the new partly obliterating the older ones, indicating the shifting of the ice streams.

Another way that boulders are formed is by weathering, which includes accidental contact with other bodies by which fragments are sometimes broken off along lines of least resistance.

If a cube of considerable size could be formed of the hardest known substance, it would only be a question of time and endurance when it would be reduced to a spherical form in compliance with the laws which govern all matter. A small cube of dense and resistant matter would be longer in assuming a globular shape, but would with equal certainty arrive at that condition.

Voluminous works have been published in ancient, medieval and modern times, and elaborate experiments made to prove that boulders were wholly the work of rivers. In 1697, Gugliemini published "Physico-Mathematical Treatise on the Nature of Rivers," and Paul Frisi in 1762, a "Treatise on Rivers and Torrents." Modern works of the same character are elaborate and exhaustive. Experiments have been made at different times and places by grinding river stones of all colors and textures on grindstones and shaking them together in boxes to determine the time and force

required to reduce them to their present condition.

Frisi and Gugliemini have recorded various experiments made with a view to prove or disprove theories prevalent in their time, as to the cause of rounded howlders, pebbles and sand found in rivers.

Both assumed that the rivers in which the pebbles were found had imparted to them their spherical form, and found by experiment that, even if swept down the whole length of the stream, they could not possibly have become rounded to the extent shown in those found high up in the rivers. Failing to account by experiment for the gravel and for the sands of the vast deserts of Tartary, Frisi came to the conclusion that they were created as such, which he expressed in the following words:

"As for myself, I am of the opinion that the rounded stones, gravel and sands are substances originally prepared by Nature and spread all over the globe; that stones rolling on the bed of a river may there receive a greater degree of polish, and sands may possibly become smaller, but that stones and gravels rubbing against each other, however great may be the force, can never be converted into sand."

A river cannot make a howlder, which can only move down the stream once, and in that part only that flows in the mountains and hills; although it may polish and somewhat reduce the size of those already formed. The Mississippi river in flowing 4200 miles conveys only fine silt; there are no howlders or even pebbles in its delta.

Danree, one of the most indefatigable of modern investigators, put three kilograms of rock fragments into an iron cylinder with five liters of distilled water. After revolving 192 hours, a movement equal to 287 miles, he found 2.72 kilos of mud, while the water filtered off contained 12.6 grams of potash.

Fragments of quartz in a cylinder revolving with a velocity of one meter per second, were rounded after a journey of 25 kilometers, and could not be distinguished from pebbles found in a river-bed.

These results may account for the condition of sands and silts in rivers, and the soluble salts in their waters, but not for the gigantic boulders and the position of the channel filling and the auriferous gravels in the California drift mines. The following quotations from one of my State reports record conclusions I have drawn from actual observation. I have since observed and collected numerous samples of this howlder weathering.

"Broken masses of granite, which consist largely of quartz, naturally weather into spherical bodies and the forces of gravitation tend to produce globular forms. I have noticed, in several localities in California, large boulders of granite in place which were rounded by the slow scaling of the surface caused by frost and rain, and have observed on convex and large sized slabs still adhering loosely to the mass. When detached, a convex surface was left on the remaining part. All mineralogists know the property of quartz minerals to break with a conchoidal fracture. On the other hand, rocks which break into angular fragments are generally soft, and easily worn down by attrition with each other. On the eastern slope of the Sierra Nevada mountains, where there are no great rivers or torrents, a tains of vast extent may be seen lying against the foot of the mountain, composed wholly of angular fragments of metamorphic rocks. These deposits extend for hundreds of miles. Still in the beds of small mountain streams in the near vicinity, the ubiquitous howlder may be found. In truth, we must search beyond the present period of natural hydraulic forces for the solution of this enigma; but it may be assumed that howlders have been ground under glaciers, and subjected again and again to the action of torrents and streams during countless ages. The zircon sands described may be regarded as a strong argument in favor of this conclusion. They were formed originally in the crystalline rocks, having been set free by disintegration. The same may be said of the magnetic sands seen in place in microscopic sections of crystalline rocks. The zircons have been subjected to the attrition which has rounded the howlders and pebbles, and ground the granites to sand, but, being harder than their associates, have resisted the force, and retain their sharp angles of crystallization most perfectly. Their great specific gravity has caused them to become concentrated."

"On the route from Oroville to Magalia in Butte county, the road lies generally in valleys which have been cut through the formation known in California as 'table mountains' which are invariably capped by lava."

"In crossing these valleys it may be noticed that the plains are covered with small howlders, varying from small pebbles to masses of considerable size; these have, without doubt, fallen from higher elevations, and cannot have moved more than a few miles at most, for they are all of the basalt of the table mountain, which, geologically speaking, is very young as compared with the formation underlying it. A close study of these howlders will develop some striking features, bearing directly on the formation of the gravel deposits of California, which came to me like a revelation, and which cannot fail to interest any observer. All the fragments, be they large or small, have taken, to a greater or less extent, a rounded form, not by attrition but by natural weathering; not only are the angles all removed or rounded, but the fragments falling from them in many instances

(Continued on page 271)

How to Tell the Age of Trees.

The practical horticulturist has many methods of getting at the age of a tree without counting the rings, just as a mathematician can tell its height without ascending to the top with a foot-rule; and some of these methods I adopted when in California, to test the assumed age of the big trees by their rings, and in every case the enormous age was confirmed.

One of these methods was to take a blaze mark, the age of which was known, and count the number of rings that had been made on the outer edge since the mark was cut. I found these averaged about 16 to the inch. Counting those in the center of a cut across stump, which must have been its early growth, I found them wider. The two together, and then averaged, would give a fair ratio of age per inch. If it took 24 of these to make an inch, which the cut on the outside proved it did, a tree 20 feet in diameter would be 1680 years old. We get at this much easier than by puzzling over obscure annual rings for half a day or more.

Another way to prove age is by noting the number of main side branches growing from the trunk in many coniferous trees, of which the White Pine and Norway Spruce are familiar examples. Looking at fine specimens of these trees, the branches seem stratified. This comes from the formation of the terminal buds at the apex of the growth of the leader. There is one very strong bud for the point, and three, four or five strong ones beside it. All below are very weak buds. It is these strong buds that make the very strong horizontal shoots that afterward give the stratified appearance to the whole tree. These in the White Pine of ordinary growth are about a foot or 15 inches apart, and even though the lower lateral branches die, they leave the "knots" by which their former existence can readily be seen. I saw Sugar Pines cut in California where a hundred or more of these branches or their knots would be readily traced, and the age fixed, and the rings of wood would exactly correspond.

But there is a method I have used that I have never seen referred to in print, and a method that has served me many a good turn when desiring to know the exact age of some fine specimen on the lawn of some place, when even the owner would declare he had forgotten when the tree was planted. It may be an evergreen with the branches growing close to the ground. The same principle I have referred to, of a strong branch pushing just below the terminal bud, and making a strong branch the next year, applies also to the lateral branches—indeed even more so, as very often the strong buds are the only ones that make a lateral during one season's growth. By counting the sections backward, I found the tree 25 years old, which I happened to know was its exact age. The height also is 25 feet, as I know by my shadow. I select a time when my shadow is exactly my height, and the tree's shadow will, of course, be the tree's exact height also.

Deciduous trees, equally with evergreens, have the strongest buds just beneath the apex of the annual growth, making stronger branchlets next year, by which the annual series may be determined; but as these leave no scars when they die away, it requires a practiced eye to determine where branchlets have been. But if a horizontal branch be in vigorous growth, the length of the last annual growth may be compared with the whole growth by a mean figure obtained between what we ascertain to be a good growth in youth and the young growth before us. This, of course, is not an exact result, but one will be surprised to find, by the annual rings, how near it approximates.

Again, the age of many trees may be approximated by the rough bark. Old botanical textbooks taught that the rifts in trees were mechanical. The bark split because the trees were pushing out. I believe it was left to me originally to show that this is an error. Every tree has its own distinct method of disrupting its bark, which could not be the case if the splitting were merely mechanical. The truth is the splitting of bark arises from the growth of cork cells, and in each species these cells have a separate specific development, and usually at a specific age. In the sweet chestnut the bark commences to rift when 25 years of age, so that all above the junction of smooth and rough bark will be 25 years. I believe the chestnut retains its smooth bark longer than any of those which eventually become rough. Some trees, like the hickory, never get rough, because the development of the cork cells begins and ends in a single year, and the bark exfoliates in the form of a thin film. These kinds always have thin bark.

In these and other ways the practical man confirms the concentric ring theory, and is able to assert, with considerable assurance, that the annual rings do mark the age of the tree.

I have found, when heated out by these positive facts, that those who dispute them generally fly to other climes. They do not, they say, behave so in equatorial regions. They may or may not. I find people know so little of what happens in unfamiliar countries, that their failure to know about what is actually before them makes the assertion not worth an argument.—Thomas Meehan, *German Town Nursery, Pa.*, in *Country Gentleman*.

HUGH J. PARK, formerly a well-known mining engineer and at one time a very wealthy man in San Francisco, died at Pomona last week.

The Late Dr. Parry.

[Written for the Press by PROF. J. G. LEMMON.]

Dr. C. C. Parry was most intimately connected with the flora and the botanists of California. Since his early explorations on the coast near San Diego, in 1849, the Dr. has made several brief visits to different regions of the western slope intent upon some special discovery or study. During one visit it was the curious little sand plants, the *Chorizanthe*, that caught his keen eye and secured his careful discrimination. Another visit was devoted to the Alders; another to the *Cacti*, etc.

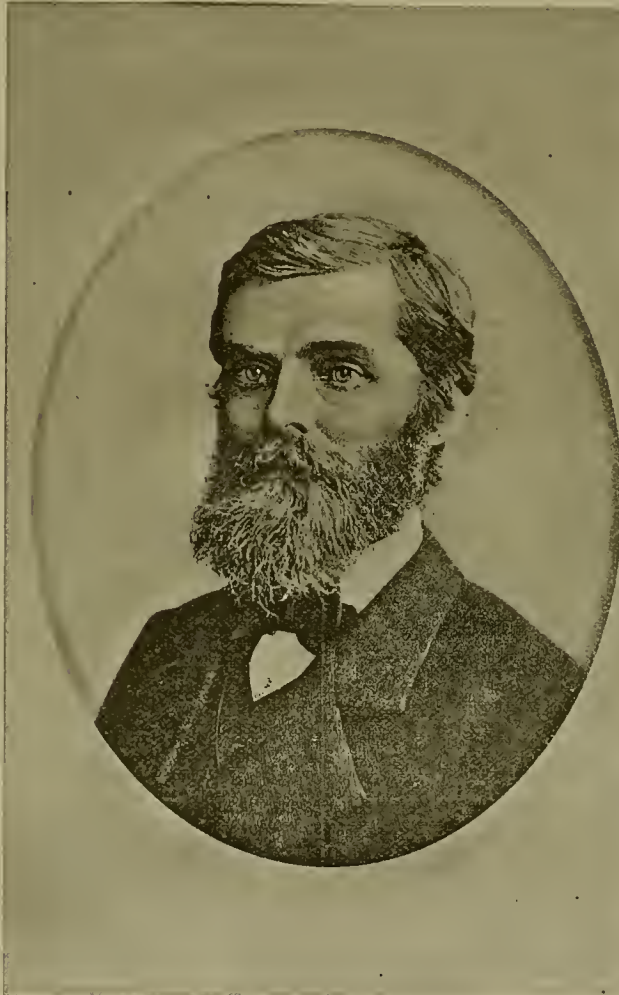
In 1882 Dr. Parry traveled well over the Pacific Slope, studying the interesting family of *Arctostaphylos* or "Manzanita," publishing the following year, in the Proceedings of the Davenport Academy of Sciences, a monograph which cleared away much of the misconception and ambiguity that bes all along enumbered our botanical literature, by showing that there were several distinct forms mingled in previous descriptions.

A second monograph, read before the California Academy of Sciences June 20, 1887, still further elucidated the subject, and the two

as the winter of 1875-6, when I joined him at Crafon for the exploration of San Bernardino valley and vicinity. From that date a warm mutual attachment has ever existed, and it happens that his last days in California were spent in the quietude of the Lemmon Herbarium, where, overlooking the roofs of Oakland and amid study and social converse, the bonds of friendship were more strongly welded, if that were possible, and the intimate companionship of long years culminating in these brief weeks, confirmed our judgment of the social, genial character and noble qualities of this busiest as well as most modest of men.

The botanists of California and of the whole Pacific Slope learn with profound sorrow that our tireless fellow-worker has ceased laboring with us and taken his first rest; and we turn in deep and tender sympathy to the loved companion who has walked proudly by his side these many years in full accord with his life-chosen work, now left to tread the rest of her journey companionless, and we would bear to her annually, as we study them, the sweet fragrance and tender bloom of the almost numberless flowers that have received their baptismal names from the lips of "Good Dr. Parry."

To Prof. Lemmon's appreciative tribute to the memory of his friend and botanical companion, we need but add a few leading facts in



THE LATE DR. C. C. PARRY.

papers cited complete our knowledge of the California manzanitas, Dr. Parry having detected and described therein six new species, besides determining the proper limits of the other nine.

Later, in 1887 and 1888, Dr. Parry performed like excellent services in the examination of our *Oenothera* family, many species of which form our coast chaparral, while others constitute the valuable forage plants called "teabushes" or "deer brush," on the interior mountainous regions. In two able monographs published February and August of 1889, he has cleared up the mass of confusion in this genus while detecting a half-dozen new species and defining the 26 remaining ones.

Dr. Parry has contributed several valuable articles to the press of this coast, chief of which was a series of sketches of early explorers, beginning with David Douglas. It is greatly to be regretted that he was not spared to continue those articles, as he contemplated, by giving his personal recollections of the pioneer botanists—Torrey, Thurber, Nuttall, Hartweg, Bigelow, Schott, Wright, Silliman, Lobb and others.

Not less successful was good Dr. Parry in making friendships among people of all classes, wherever he journeyed. Genial, witty, cheerful, apt at repartee and hadinage, as he was generous and noble-minded in all discussions, he was always welcomed to every fireside on his busy rounds of discovery.

It was the good fortune of the writer to meet Dr. Parry and his esteemed wife as early

the life of the esteemed scientist. Dr. Charles C. Parry was born in Admington, England, Aug. 28, 1823, and came to this country with his parents in 1832, settling in New York State. He graduated with full honors from Union College and afterward studied medicine, was admitted to practice, but chose rather the pursuit of the sciences, especially that of botany. In 1846 the family moved to Iowa, and Dr. Parry practiced medicine a few months, but the following year began his work as a botanical explorer in the new regions of the great West. This work was continued year after year, much of the time being devoted to official botanical work in connection with the Government surveys, and his territory being the Rocky-mountain region. This work was pursued up to the commencement of his work on this coast, as mentioned by Prof. Lemmon. Dr. Parry left a comfortable property in Iowa, thus providing for his faithful wife who survives him. Dr. Parry's portrait, which appears upon this page, is a photograph from a photograph kindly furnished by Prof. Lemmon.

THE BLIND SELDOM SMOKE.—A peculiarity about the blind is that there is seldom one of them who smokes. Soldiers and sailors accustomed to smoking, and who have lost their sight in action, continue to smoke for a short while, but soon give up the habit. They say that it gives them no pleasure when they cannot see the smoke, and some have said that they cannot taste the smoke unless they see it.

The Coming Census-Taking.

Interesting Information about Methods.

The interesting announcement is made at the Census Bureau that the work of preparing for the coming enumeration of the population next June is practically over, so far as the central management in Washington is concerned. The Superintendent of the Census, Robert P. Porter, has, in fact, got the machinery of the Bureau in such good running order already that he has been able to take advantage of the present period of routine inactivity to go on a ten-days' vacation—getting a breathing spell now that he would probably have been obliged to forego during the busy period of tabulation and computation which will follow the actual gathering of the statistics.

The manner of getting at the number of inhabitants in each State or Territory is simple and effective. The supervisor's district is the unit of the system. The supervisor appoints the enumerators, among whom the work in the district is to be subdivided, and is responsible for their zeal and accuracy. By a provision of the law no enumerator is to be required to look after an subdivision of more than 4000 people, and he is also expected to be a resident of the subdivision and personally familiar with a great number of the families which he is to visit. The average size of a supervisor's district may be guessed from the fact that New York and Pennsylvania have each 11; Ohio and Illinois, 81; New Jersey and Connecticut, 2. Many inequalities occur, however, in the division, according to population, New York City, Kings, Queens, Richmond and Suffolk counties making up together only two of all the 11 in New York State. Massachusetts, similarly, forms but a single district, while Maryland has three districts.

The enumerator is to start out on his inquiry on June 21. If he is to work in a city of more than 10 000 inhabitants, he must finish his canvass in two weeks. If he has a country subdivision, he will not be called upon for a return until the end of the month. The list of questions drawn up for him is given below. With this he must go to each family, and, if possible, get answers from each member of it to all the questions which fit the case.

1. Give Christian name in full, and initial of middle name, surname.
2. Whether a soldier, sailor or marine during the Civil War (United States or Confederate) or widow of such person.
3. Relationship to head of family.
4. Whether white or black, mulatto, quadroon, octoroon, Chinese, Japanese, or Indian.
5. Sex.
6. Age at nearest birthday. If under one year, give age in months.
7. Whether single, married, widowed or divorced.
8. Whether married during the census year (June 1, 1889, to May 31, 1890).
9. Mother of how many children, and number of these children living.
10. Place of birth.
11. Place of birth of father.
12. Place of birth of mother.
13. Number of years in the United States.
14. Whether naturalized.
15. Whether naturalization papers have been taken out.
16. Profession, trade or occupation.
17. Months unemployed during the census year (June 1, 1889, to May 31, 1890).
18. Attendance at school (in months) during the census year (June 1, 1889, to May 31, 1890).
19. Able to read.
20. Able to write.
21. Able to speak English. If not, the language or dialect spoken.
22. Whether suffering from acute or chronic disease, with name of disease and length of time afflicted.
23. Whether defective in mind, sight, hearing or speech, or whether crippled, maimed or deformed, with name of defect.
24. Whether a prisoner, convict, homeless child, or pauper.
- 25 and 26. Is the home you live in hired, or is it owned by the head or by a member of the family?
27. If owned by head or member of family, is the home free from mortgage incumbrance?
28. If the head of the family is a farmer, is the farm which he cultivates hired, or is it owned by him or by a member of his family?
29. If owned by head or member of family, is the farm free from mortgage incumbrance?
30. If the home or farm is owned by head or member of family, and mortgaged, give the post-office address of owner.

Many of the questions, it will be seen, are not intended to be put to all the members of the family visited. From their general scope they are likely to furnish the Bureau with all the information that is needed in the treatment of population and social statistics.

AN EIFFEL TOWER OF ICE.—The Eiffel ice tower completed at St. Petersburg is over 150 feet high, and is composed of 10,000 blocks of ice. The first platform is occupied by a splendid restaurant, and the whole structure is radiant at night with thousands of electric lights, forming a dazzling spectacle.

DURING the month of March there were worked 12,330 tons of Con. Cal. and Virginia ore. The average yield in billion per ton was \$19.96, of which \$10.74 was gold and \$9.22 silver. The average assay of the battery samples was \$24.47 per ton.

IN STAVE-DRESSING twelve co-laborers with a machine can dress 12,000 staves in the same time that twelve workers by hand could dress 2500.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Alameda.

CHROME.—Livermore *Herald*, April 11: N. R. Knight is in town this week, and is paying daily visits to the chrome mines. He predicts considerable activity in our mines this season, as there is a good demand for chrome. Mr. Knight and associates are fitting up an old smelting-works building near Melrose with appliances for crushing chrome, it being more acceptable in the Eastern market in that shape.

Amador.

MILL.—*Ledger*, April 12: The mill at the Amador gold mine is about completed. The hitch in regard to the right of way for the car track has not been finally settled, although the terms of settlement have been agreed upon. At the Hardenberg, taking out the water from the shaft is progressing rapidly. For several days it was noticed that while they were taking out large quantities of water the water level in the mine remained stationary. An examination disclosed the fact that the water, as fast as taken out, drained back into the shaft by another opening; as soon as that was fixed the water was lowered fast. A ledge said to be ten feet wide has been struck in the Gardner claim near Irishtown. The ore carries large quantities of sulphures, and shows some free gold. Samples of rock may be seen at Newman's store. Petrie and Tripp are running a tunnel at the Culver mine, near Big Bar bridge. This claim was recently purchased by Mr. Petrie from E. A. Culver.

Calaveras.

WEST POINT.—Cor. Calaveras *Chronicle*, April 12: The mining interest is looming up, and, from the present outlook, it bids fair to make this section of Calaveras lively this summer. The Lone Star is showing an immense body of very rich ore. The Blazing Star hoisting works are nearing completion, and work will be resumed in the mine at an early day. Work is also being vigorously pushed ahead on the Scorpion works and its whistle, too, will soon be calling the miner to his daily toil.

El Dorado.

ACTIVE.—Georgetown *Gazette*, April 12: The general activity prevailing everywhere over the Divide, below the snow line, shows that we have entered upon the most prosperous season that has been experienced for many years. Industry is booming all along the lode from Kelsey up through Garden Valley into Georgetown and into Volcanoville mining district. Slate mountain and Bear Creek are chock full of stir in quartz and placer mining, while the Greenwood seam belt is alive with energy. The Georgia slide seam mines were never more active, and numerous surface diggings are being worked from Georgetown to the snow line. The Onion Valley placers will be worked as soon as the snow permits. Other interests are also taking on new life.

Mariposa.

BEAR VALLEY MINES.—*News*, April 12: Reports from Pine Tree and Josephine mines at Bear Valley represent the development of a large body of low-grade ore as one of the results of the prospecting which has been going on for the last two years in that locality. Mr. Stanley, the mining expert, is making a very thorough practical investigation of the mines upon the grant, and will be able to make an elaborate and intelligent report. There is a strong probability that something more than prospecting will be done during the coming season. This property is in the heart of the mining district. The mother lode runs through it, and outside of that there is a network of smaller gold-bearing veins. Practically, the mining heretofore done has been prospecting, or, as the old Comstock miners would say, "among the grass roots." This will apply to mines at Princeton and Mariposa as well as Bear Valley.

POCKET.—Several very pretty specimens of rich quartz have been brought in from Sebastopol during the past week. They were from the old Hart mine, which some years ago yielded excellent returns. The ore is in bunches, or in other words, it is a pocket mine.

Nevada.

MINING BRIEFS.—*Tidings*, April 12: A small vein of high-grade ore has been cut in the bottom of the shaft at the North Banner. The ledge gives every indication of widening and permanency. Early next week the Omaha Co. will commence hoisting out of the Lone Jack shaft, using water for power. Waste rock exclusively is to be hoisted through this shaft, the quartz to be sent up through the Omaha shaft. Forty-five miners' inches of water are running out of the Peabody drain tunnel. In view of this fact, the pump was not started this week as contemplated. Next week will see the pump in operation, however, and in a few days thereafter the water will again be pumped out, for the third or fourth time this winter. However, there will be no more delays from this source, and sinking will be pushed with all expedition. Nobody would be surprised to hear of a bonanza being uncovered in the Peabody.

DRIFT GRAVEL.—*Herald*, April 12: Capitalists are negotiating for a gravel claim on the Washington ridge which has been developed enough to just prove that a channel has been struck, and the gravel prospects well enough to show that it would pay if properly worked. That ridge has gravel a good portion of the distance between here and Phelps' Hill. There is ground yet unclaimed which offers a good field for prospective work. It is within the range of possibilities that much of it will be located and worked this season. If the San Jose turns out as well as it promised last fall, gravel property up that way will soon command a good price.

YOSEMITE.—*Telegraph*, April 12: The owners of the Yosemite gravel mine feel very much encouraged now at the prospects. The drift is in about 700 feet, and a few days ago an upraise of about 30 feet was made and pipeclay was struck which pitched downward. The lower drift will now be run and it is expected that a short distance will develop a rich gravel lead. The Yosemite is located at Selby Flat, a short distance above Nevada City, and in a region abounding with gold. In the early days an immense amount of wealth was taken from the surface ground on Selby Flat, and there is plenty left. John

M. Thomas of the Citizens' Bank in Grass Valley, and W. D. Harris are the principal owners of the mine.

THE GOLD HILL.—Grass Valley *Tidings*, April 11: The Messrs. Hopkins, George Mainhart and Surveyor Uren went out to the Gold Hill mine this afternoon and took notes and measurements to promote the preliminary work for reopening the mine. A steam plant is to be put on, active operations to commence in a month or less. Later on water-power will no doubt be introduced, and the steam plant retained only for use in cases of emergency. If the Gold Hill does not prove to be the equal of any mine in the district, everybody who knows the history of the property will "lose their guess," as the miners say.

Orange.

BIG COAL ENTERPRISE.—Los Angeles *Express*, April 10: On Monday last a party of well-known citizens of Los Angeles returned from an inspection of a very valuable coal bed in Orange county. There were in the party Col. J. C. Robinson, vice-president of the Los Angeles Cable Co.; ex-Mayor John Bryson, Dr. J. H. Bryant, Supt. E. E. Hewitt of the Southern Pacific Co.; Capt. A. W. Barrett, H. J. Woollocoit, John McCrea and Charles Seyler. The location of the coal bed is in Santiago canyon, about 10 miles east of Santa Ana. The gentlemen made a very thorough examination of the prospect. A tunnel had been run into the hill, and at a depth from the surface of about 16 feet were found four or five blanket veins of very good-looking coal. The intention is to form a joint-stock corporation to open and develop the property. A shaft is to be sunk and all these veins very thoroughly explored. Ten thousand dollars is to be laid out at once in this preliminary work. The corporation will be known as the Carbondale Coal M. Co. A year or more ago D. M. Tomblin, an enterprising resident of Tuslin, exhibited specimens of this coal in this city and exerted himself to interest capital in the development of the property. It is averred that should the enterprise be carried out as now projected the new enterprise will be able to lay down coal in Los Angeles at \$6 a ton.

Placer.

THE DRUMMOND QUARTZ MINE.—*Herald*, April 12: The old-time miner and mining superintendent, Wm. Werry, after the hard winter, has again taken charge of the Drummond quartz mine, near Iowa Hill, and reports everything as looking well. A contract has been let to run tunnel No. 2, in which the ledge is likely to be struck soon. Mr. Werry thinks this lower tunnel will demonstrate the mine's increased value. But even the openings in tunnel No. 1 show the Drummond to be a rich mine and good for years. If they strike good ore at a lower level, so much the better. The intention is to soon have another mill in operation, probably by the 1st of May. There are now about 20 men employed, and when the new mill is started they will increase the force. When in full operation they expect to crush from 30 to 35 tons of rock per day.

San Diego.

BANNER.—Julian *Sentinel*, April 11: As De-maids has departed, I will give you a few items from Banner. The Cincinnati Belle Co. have their new shaft down 80 feet, with a good ledge of ore. They have built a road from the mine to the Cuyamaca mountain, via Bob Gardner's, for timbers, etc. The Ready Relief are running their ten stamps on good ore. The Warlock boys are about to make a deal with Pomona parties for their mine. The Point Loma Co., of the North Golden Chariot, are in 80 feet with their tunnel and expect to strike the ledge at 150 feet; then look out for big reports. Bryan Obeir and Expert Werlitz, of St. Louis, will soon arrive at Banner and will commence operations on the Kentucky.

PINE VALLEY.—San Diegoan, April 10: Coroner Eadon, who has just returned from a trip to Laguna, reports mining matters lively in Pine Valley. "I stopped over at Goodbody's camp at the Eureka mine. They have ten men at work and are taking out a good deal of ore. They have a five-stamp mill, but it is at present idle for the reason that the bed of the crusher is broken, and they are waiting a new one from San Francisco. Another mine is being worked near by."

Sierra.

WIDE AWAKE.—Mountain Messenger, April 12: At the annual meeting of the Wide Awake Mining Co., held in Downville, April 7th, the following named were elected directors for the ensuing year: F. Ensich, J. A. Blohm, C. F. Eckard, P. R. Gardner and J. M. B. Meroux. At a subsequent meeting of the Board of Directors, P. R. Gardner was chosen President, H. T. Briggs, Treasurer, and A. J. Meroux, Secretary. The mine is opened for work and 18 ounces of gold, the first cleanup this season, was washed out this week. Mr. P. R. Gardner will have charge of the property until a superintendent is appointed. Nine men are employed and more will soon be engaged.

THE CLEANUP for March at the Young American quartz mine was about \$15,000.

Sutter.

GOLD DUST.—Sutter County Farmer, April 11: T. S. Kersey of West Butte, a pioneer miner, was in town last Saturday, and brought with him a quantity of gold that he had washed out during the past winter. On his range in the Buttes there are many places containing free gold, and during the rains while water can be procured, good wages can be made with the pick and pan. Mr. Kersey had only worked at odd times, and had secured about \$30 worth of the precious stuff. Some fair-sized lumps of gold were shown in the box containing the dust.

Tuolumne.

RICH ROCK.—Tuolumne Independent, April 12: We are informed that some very rich rock has been discovered in the extension between the Black Oak and Live Oak mines, said to be the richest rock Soudhyville has yet produced. The Dead Horse mine is at present showing some very rich ore.

Trinity.

WORK PROGRESSING.—Trinity Journal, April 12: Last Tuesday the Trinity Gold Mining Co. had 160 inches of water through the lower ditch, and by Saturday evening they expect to have the ditch running full. It will take about four weeks to get the upper ditch ready to carry water, but with water the lower one will furnish good work can be done.

EAST FORK.—The Enterprise mill is running in good shape. Yesterday the Yellowstone started up,

and is running day and night. Mr. Paxton has quite a force of men at work, having three shifts on the lower tunnel. Smith and Watrous are having a good run this season, and judging from the muddy water in East Fork they must be moving considerable dirt. Prospectors are commencing to move around through the mountains, and some assessment work is being done.

NEVADA.

Washoe District.

POTOSI.—Virginia Enterprise, April 12: The east crosscut, 300 feet south of north line, 850 level, is out 196 feet; face in porphyry with streaks of quartz which give good assays. East crosscut 400 feet south of north line, 850 level, is out 158 feet; face in porphyry. The winze below the 930 level is down 43 feet; the bottom is showing stringers of ore of good grade. The raise above the 930 level is up 85 feet; the roof is in quartz giving assays of from \$25 to \$40 a ton.

ALTA.—Are working in the stopes between the 925 and 825 levels and drifting southeast on the 1040 level; face of drift in low-grade ore. Milling about 45 tons of ore daily, of the average value of \$20 per ton.

YELLOW JACKET.—Shipping about 65 tons of ore daily of the average value of \$22 per ton, and doing extensive prospecting work.

CON. IMPERIAL.—West crosscut No. 2 from the 500 level north drift (Yellow Jacket), which is the 750 level of the Imperial, is out 238 feet, having been advanced 30 feet during the week. The north lateral drift in No. 1 crosscut on the same level is in 115 feet, 20 having been added during the week. The face shows quartz and porphyry.

CROWN POINT.—Have started to open the old west crosscut on the 230 level and to advance it over the 300 level west stop. Shipped to the mill during the week 787 tons of ore, the average battery samples of which assayed \$24.52 per ton.

BELCHER.—The 200 south drift from the west crosscut is out 175 feet, having been extended 40 feet during the week. The face is in low-grade quartz. The 300 west crosscut is out 65 feet. The face is all in quartz showing spots of pay ore. The 600 south lateral drift is out 217 feet, having been advanced 15 feet since last report. The 800 joint crosscut is out 323 feet, and the face is in hard porphyry.

CONFIDENCE AND CHALLENGE CON.—The joint Confidence and Challenge raise is up 18 feet, having been commenced during the week. The top shows low-grade quartz.

OVERMAN.—Have extracted and hoisted from the 1200 level 213 tons of ore. Shipped to the Vivian mill 283 tons of ore. Battery average, \$18.02 per ton; of this amount \$10.04 is gold. Stopes are looking well and yielding the usual quantity and quality of ore. Shipped one bar of bullion valued at \$7372.97; previous shipment, \$6336.49. Total for the month of March, \$13,709.46.

JUSTICE.—The north drift, 622 level, advanced 18 feet; total length, 770 feet. The face is in low-grade quartz. The southwest drift, 490 level, advanced 10 feet; total length, 563 feet. The face is in hard rock. Shipped to the mill during the week 196 tons of ore, the average battery assay of which was \$26.10.

SEGREGATED BELCHER.—The 1000 level south-east drift is out 103 feet south of north line, and they have connected with the end of the east crosscut. The 850 level joint crosscut is out 323 feet, having advanced 28 feet since last report. The face is in hard porphyry.

CHOLLAR.—The east crosscut, 80 feet south of north line, 750 level, is out 110 feet; face in porphyry. The east crosscut, 80 feet south of north line, 850 level, is out 115 feet; face in porphyry.

EXCHEQUER.—The east crosscut on the north line, 500 level, is out 167 feet; face in porphyry. The north lateral drift, 600 level, is out north of Alpha shaft 227 feet; face in quartz and porphyry.

ALPHA.—The west crosscut, 500 level, 100 feet north of shaft, is out 547 feet; face in hard porphyry. The south lateral drift, 600 level, is out 19 feet; face in soft porphyry and stringers of quartz.

SAVAGE.—On the 300 level the south and north lateral drifts are advanced respectively 159 and 84 feet. Are extracting ore from the 400, 500, 600 and 750 levels, and are running prospecting drifts on each of these levels. During the week they milled 459 tons of ore of the average value, as per battery samples, of \$22 per ton. Have bullion on hand amounting to \$6304. The total bullion yield of March was \$28,855.65.

SCORPION.—On the 630 level the southwest drift from the shaft has been advanced 60 feet in a porphyry formation.

HALE & NORCROSS.—No work has been done in the mine since last report up to Wednesday, when work was resumed, except timbering the shaft and repairing the south lateral drift on the 500 level, both of which repairs are completed. Have started No. 1 east crosscut from the south drift on the 500 level, and advanced it 20 feet. It is hoped to encounter in this crosscut the northern continuation of the ore recently disclosed in the Chollar drift near the Hale & Norcross south line. Milled during the week 280 tons of ore of the average value, as per battery samples, \$20 per ton.

SILVER HILL.—The south drift from the shaft, 160 level, is out 545 feet; face in clay and porphyry. The northeast drift, 260 level, is out from the shaft 650 feet; face in clay and porphyry. During the week have been repairing the 400 level station.

WARD COMBINATION SHAFT.—The east drift from the 1800 level station is out 314 feet; face in porphyry.

JULIA.—No work has been done in the northwest drift the past week except repairs.

CON. NEW YORK.—The west drift from the shaft, 650 level, is out 250 feet; face in porphyry. The north lateral drift, 800 level, is out from the west crosscut 203 feet; face in clay and porphyry. The raise from the 800 level is up 214 feet; the roof is in quartz giving fair assays. The south lateral drift, 950 level, is out from the shaft 133 feet; the face is in quartz giving low assays.

BEST & BELCHER.—On the 1000 level, east crosscut No. 1 has been extended 22 feet; total length 327 feet. Formation, hard porphyry. On the 1200 level the north drift has been cleaned out and repaired 40 feet; total distance, 570 feet.

GOULD & CURRY.—On the 200 level west crosscut No. 1 has been extended 18 feet; total length, 134 feet. Formation, soft porphyry. On the 400

level west crosscut No. 1 has been extended 18 feet; total length, 560 feet. Formation, soft porphyry.

ANDES.—Drift on 420 level advanced 70 feet. Formation, clay and porphyry, with stringers of quartz. On 350 level still advancing repairs.

Central District.

GOOD PROSPECTS.—Cor. Silver State, April 11: Central district, which, like most of the mining camps in the State, has been dormant ever since silver was demonetized, is now coming to the front again. Lately some very rich mines have been developed and large bodies of ore have been found at a considerable depth, which are very rich in gold and silver, and will soon be sending forth a large output of bullion to the markets of the world and adding to the many industries of Humboldt county. The following are a few of the leading mines in the camp: The Locomotive, owned by Frank Clark, and perhaps the oldest and most developed mine in the camp, has been running steadily for a number of years. Considerable work has been done and the mine has paid its owner from the grass roots down. The Aurum, owned by Clark & Stodding, is one of the richest mines in the camp. At a depth of about 150 feet a body of ore was discovered which is from 18 to 20 inches wide, and averages about \$700 in gold to the ton. The ore also carries very rich galena, which ranges from \$125 to \$200 in silver to the ton. The mine is rapidly being developed and is one of the best prospects in Humboldt county. The Millionaire, owned by A. H. Ruse & Son, is also a rich property, and is being worked at a depth of 200 feet with a large body of ore in sight, which is very rich, and ranges about 18 to 30 inches in width and assays very high in gold and silver. At present they have no way of hoisting the ore and have to stow it away in drifts in the mine, but the owners expect soon to have a whim in operation. The Railroad, owned by Norman Gilbert, is another good mine, and is developed to a large extent and has an immense body of ore in sight. The Keystone, owned by Alex Wise, is another on the list of good mines in the district and has rich ore in sight. It is expected this mine will be worked this summer. Frank Reynolds is running a tunnel to tap a ledge, which prospects good on the surface, and he expects to strike ore shortly, as indications show that it is not far off. He has already cut several small seams of ore in the tunnel, which is now in about 125 feet from the surface. Quite a number of prospectors are in the hills, and it is probable that other good leads will be found before very long. The camp has quite a lively appearance, and it is the hope of everybody that it is on the verge of a boom.

Bureau District.

SURVEY AND EXAMINATION.—Sentinel, April 12: Gen. Robt. M. Clark arrived here from Carson last Tuesday and has been examining the Prospect mountain tunnel and Colorado mine, with a view of ascertaining if the ore that has been extracted from the tunnel and workings has come from the Colorado ground or not. Surveyor Read has been surveying the Colorado mine and the tunnel for the same purpose, as well as to ascertain what amount of ore has been extracted from the Colorado ground. What the result will be we cannot foretell, but steps will probably be taken to prevent the Tunnel Co. from taking ore from any of the mines the tunnel penetrates that they do not own. It would be a good thing if the owners of those mines, and the Prospect Mountain Tunnel Co., would agree to a compromise, and better still if all of them were consolidated. There are several good mines that could be worked through the Prospect mountain tunnel, principally the Silver Connor series, Williams series, Colorado, Avon, Manhattan, Pentier, and Cosmos. If all of these mines were consolidated with the tunnel, which has penetrated the mountain for a distance of 2350 feet, it would make a very productive and a great and valuable property, particularly if it were to fall into the hands of a big incorporated company. The mines mentioned have yielded a large amount of ore, and there are all the evidences of great value and permanency in them. General Clark returned to Carson yesterday.

SHIPPING ORE.—We learn that ore in considerable quantities is being mined by the lessees of the Bullwhacker mine, owned by the Ruby Mining Co. (Limited), and shipped to Salt Lake for treatment. It is quite remunerative on account of the high percentage of lead it carries. The entire amount of ore shipped over the railroad during the week from the following mines was 43 carloads. Twenty-two cars loaded with ore from the Jackson, Phoenix and Bullwhacker mines, pulled out of the railroad depot last Wednesday, destined for Salt Lake City.

Tuscarora District.

NEVADA QUEEN.—Times-Review, April 12: North gangway from 600-foot station of North Belle Isle has been advanced 24 feet. A strong flow of water is coming in.

NAVAJO.—Crosscut from the end of south drift, 150-foot level, extended 16 feet. The crosscut from the north gangway, 350-foot level, extended 23 feet; total, 44 feet. No material change since last report.

NORTH BELLE ISLE.—The stopes above the 300-foot level are without material change. North gangway from the shaft, 600-foot level, has been extended 24 feet. The water is coming in pretty strong.

BELLE ISLE.—The crosscut near the Navajo line, 250-foot level, has been extended 8 feet, cutting some low-grade ore. A drift has been started north from the crosscut and extended 6 feet. South drift from crosscut on the 350-foot level extended 13 feet.

GRAND PRIZE.—500-foot level: East drift from north crosscut extended 9 feet without change. North crosscut from front vein extended 21 feet. Have passed through the north vein. A drift is started east upon the vein; the face is in concentrating ore of fair grade.

DEL MONTE.—First level—North gangway has been advanced 27 feet, total 98 feet, spar and iron pyrites showing in the face. North drift from joint crosscut extended 10 feet, seams of high-grade ore all through the face of drift.

COMMONWEALTH.—We have sent 520 tons of ore to the concentrator, which is running all right; 110,200 pounds concentrates on hand, weighed as taken from the vanners.

NORTH COMMONWEALTH.—First level—No. 2 east crosscut has been extended 15 feet through the vein, showing some good ore. North drift from

No. 1 east crosscut advanced to feet and connected with south drift from joint crosscut. Have started to drift east from this point.

ARIZONA.

NOTES.—Prescott *Courier*, April 11: Word from Bradshaw district is to the effect that the Gray Eagle mine is being opened in a workmanlike manner and is looking well. Both mills are running. Mr. Williams, superintendent of the Boggs, Hackberry and Senator mines, is opening all three mines in the right way. Water is still a troublesome element in the Senator. The Congress mill, which has run night and day for ever so many months, is now getting a thorough cleaning. Supt. Giroux thinks of starting United Verde smelters early next week. Several sales of undeveloped lodes have been made this week. Several wagon-loads of gold sulphurets came here yesterday from the Congress mine. T. W. Boggs of Big Bug district said recently that there are some 60 men working in and about the Hackberry and Boggs mine. The vein in the last named mine is very large. N. C. Sheekles of the Crowned King mine arrived here recently from the mill, which is running and paying. The company's most refractory ores are shipped East. Wm. Murphy has taken men to Bradshaw to work in Wm. A. Linn's fine claim on the Tiger. The Black Horse mine continues to improve as depth is attained. The old Farnham mill, Walker district, is running day and night, mostly on custom ore. Foster & Robeson have started work in the Middleton mine, Walker district, and will commence shipping ore. Miners are talking a great deal about the rich strike in the Hackberry mine, Big Bug district. Frank McCabe's mines, near Glendale Gulch, are producing high-grade ore. N. L. Griffin, J. W. M. Moore and a good many more Walker district miners are sending ore to Joe Chambers' mill. Placer miners of Black Canyon creek are sending in considerable dust to Cordes and Bumblebee stations. Mr. Williams, manager of several mines in this section, has gone to Yucca, Mohave county, to start work in his copper mines, which means that he will, ere long, be smelting in Copper Basin, 13 miles from Prescott. Harlan's mill, on Hassayampa creek, is crushing out the gold. The Congress mill has been overhauled and is working away with usual good results. Miners of Tip Top district are shipping a great deal of high-grade silver ore to the smelter at El Paso, Texas. Jake Henkle is commencing to ship rich ore from his Rapid Transit mine, Bradshaw district. Santa Maria mines are attracting attention. Charles Bennett is opening a promising ledge in Groom Creek district. Turkey creek miners are praying for the water to recede. It is too much for them. J. W. O'Bryan will install new life into Placeritas district in a short time. It is well enough to remark every once in awhile that failures here are not chargeable to Arizona or Arizonians. They can honestly be charged up to detailed "superintendents" who had more money than mining brains.

COLORADO.

THE BUSHWICKER.—Aspen *Times*, April 10: The Bushwick management has met with much difficulty during the past few days in getting the ore from the mine down the mountain. It might be supposed that the Smuggler mountain road would be in a passable condition by this time, but such is not the case, the road on top of the mountain being extremely boggy and at other points rough and unsafe. Seven wagon-loads of ore that were loaded Monday did not get into the samplers until yesterday afternoon. In the meantime the product of the mine has been piling up on the dump and it has been determined to transport the ore by jack train until such time as wagons can again make the trip. One hundred and sixty jacks were sent to the mine yesterday and brought down 25 tons of ore. This ore is of the usual high grade, ranging from \$100 to \$200 per ton. The mine is continually improving in appearance and it looks now as if shipments of 35 or 40 tons a day would soon be possible. When it was found recently where the main ore body lay, the second level north was started to reach it on its downward trend. This level is just coming into mineral and it is believed that the rich ore chute will soon be showing up at that point. If this expectation is realized the management will be assured of several hundred thousand dollars' worth of mineral between the two levels.

IDAHO.

SMOKY—Ketchum *Keystone*, April 7: We are informed that the outlook of the Smoky mining district is very encouraging. Our informant says that the Carrie Leonard and Pot Wrestler mines, which are being worked under a lease, have not looked as well for the past three years as they do at present. The prospects of the Fraser mine, owned by the Philadelphia and Idaho Co., are looking very flattering, and the number of miners will no doubt be considerably increased as soon as the roads will admit of getting in supplies to the mines. A few men have been working at the King of the West mine during the winter, and it is reported that this mine never looked better or more promising than at present. Arrangements are being made by which the miners of Smoky expect to make shipments of ore in the course of a couple of weeks. They will use pack-trains until the roads become passable for wagons. The prospects of the entire Smoky district for a prosperous season are exceptionally bright. An important development is reported in the lower works of the Red Elephant mine at Bullion. The ore body is said to be six feet wide.

SEAFORD MINES BONDED—Challis *Messenger*, April 8: The Eureka, Midway and Ella and a two-thirds interest in the Big Sulphur mines, Seaford district, have been bonded by Messrs. Mat Womacks, Lee Womacks, Carl Laue, D. W. Clum and Henry Duffy to C. E. Keller of St. Paul, Minn., through his agent, Wm. J. Scott of Challis. The bond is for five months. These properties are all developed, the Eureka the most extensively, and ore has been shipped from them to Ketchum which averaged about 135 ounces per ton, the lowest being 110 ounces and the highest 150 ounces per ton. These properties are considered by all miners of Seaford to be among the best locations of that rich district, and conservative mining men who have examined them thoroughly think that with full develop-

ment they will rank with the first mines of the other permanent districts of Custer county.

MONTANA.

CHAS. CLARK'S PURCHASE.—Phillipsburg *Mail*, April 12: Charles Clark, of Granite Mountain, took up the deed in escrow in St. Louis, Saturday, of the Harris & Hazleton group of mines in the Beaver creek district and paid the purchase price in cash, \$75,000. These mines, it is said, have paid the owners \$10,000 per month net, for several months past.

GRANITE MOUNTAIN.—The output for the week ending April 10 was 51 bars of bullion, containing 79,585 ounces fine silver and 155 ounces fine gold.

NEW MEXICO.

DEVELOPMENT WORK.—Silver City *Enterprise*, April 11: James Smith and John Stone have been working out some excellent ore at Bald mountain. Wm. Brahm contemplates the erection of a silver mill at Lone mountain in the near future. He will treat custom ores. Wm. Beall and Col. Dan Casey are drifting from bottom of shaft on the Only Show mine in Cow Springs district. The boys are taking out some very fine chloride ore with considerable in sight. Iron ore is now being shipped from Legal Tender hill at the rate of two cars per day. George W. Wearing, of Deming, states that the building of the new road from Deming means the early completion of the new smelting plant upon which he has been working for the past year. The completion of the smelter at Deming will be of great advantage to many mines in this section of the county, and especially to those of Pinos Altos, which produce low-grade concentrates. And still they come to the front. The new strike on the Oseola mine, the north extension of the Deep Down in Atlantic gulch, is something over which mining men in other mining States would rave and newspaper correspondents warm the wires. In a drift run from the 60-foot level, there has been discovered a body of ore over 12 inches in thickness, which is sprinkled, pepper and salt fashion, with free gold throughout the entire mass; an average of over 12 inches assaying 33 ounces of gold per ton. The talcose vein matter adjacent thereto for a width of 18 inches, running from three to five ounces in gold per ton. The owners, Messrs. Martin Cox and Jake Long, are very much elated. The recent strike in the Alhambra at Black Hawk is probably the finest body of ore ever developed in this district. It is without doubt the most extensive chute of native silver ever uncovered in the Territory. The drift has now been driven over 20 feet along on the ore body and only the apex of the ore chute has been uncovered, yet the ore is so exceedingly rich that over \$20,000 is now exposed in sight, with an underhand stope of virgin ground to be explored.

OREGON.

HYDRAULIC COMPANIES.—Grant's Pass *Courier*, April 10: The four hydraulic mining companies on Williams creek, viz: Elick Watts, Bigham & Co., Sparlin & Co. and J. T. Layton & Co., are all running with plenty of water in pay dirt. The Pacific Hydraulic & Gold Mining Co., on Grave creek, are working two pipes night and day. The high water damaged their mine considerably by washing out two bridges, otherwise they would have had six pipes playing on pay dirt. The Grant's Pass Mining & Lime Co. are operating on their time claim, three miles east of Woodville on Ward's creek. They have burnt one kiln of 850 bushels, and from this time on will burn six kilns every four weeks. They expect in the near future to construct a Put kiln with which they will burn 100 barrels of lime per day; this will require an expenditure of over \$3000. This is one of the best lime quarries on the coast. Long years ago a couple of miners struck quartz on Horseheaven creek, a tributary of Williams creek. Patiently they toiled in developing their ledge, and after working down on the ledge, to further demonstrate the richness of their find, they started a tunnel from the face of the hill many feet below. With common black powder and drill they penetrated the hill some 60 feet, but failed to find their ledge which gave such rich promise higher up. Vainly they run side drifts, no ledge could be found, and after years of toil and the utter depletion of their money they abandoned the mine. A third of a century rolled away. Rubbish and a tangled growth of wild weeds and underbrush had obliterated all signs of the work these men had done. The mine was forgotten, and even tradition failed to note its locality. The flood of 1890 came; the saturated hillside lost its hold on the long-hidden bedrock, and with a roar and a crash it came down. But there was no one near to hear the uproar made by the falling mountain-side, for it was far out in the peopleless mountains. Recently Mr. S. Messenger happened in the vicinity of the old forgotten mine, and going to it, found that the landslide had completely denuded the face of the hill, revealing a well-defined ledge, and also how near, bow very near, the disheartened miners had come of striking the sought-for ledge. By a strange freak the ledge had veered from its indicated course, and by a very few feet the miners of long ago missed it. Mr. Messenger is an experienced quartz miner, and after fully testing the rock is satisfied it is good. He is now preparing to work it. It is free gold, and one or more arastras will be put to work on it right away, the machinery for which is now ordered.

UTAH.

GRAPHITE.—Eureka *Chief*, April 11: A large body of graphite has been discovered near Santaquin. The Victoria Mining Co. have a force of men at work on their claims near Silver City. Quite a number of new dwellings are being put up at Silver City and Mammoth, and the people of these rich camps look forward to a season of growth and prosperity. The fine weather of the past few days has caused the feet of the prospectors to itch, and many are striking off into the mountains and canyons in search of pay dirt. Since the strike of ore in the mountains beyond Homansville, the houses there so long vacant are again being occupied, and where bats and the festive coyote have so long held sway is now the scene of hopeful activity. Ed Brim accidentally discovered a body of mica near Silver, Thursday.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING APRIL 8, 1890.

- 425,365.—SNOW EXCAVATOR—D. R. Bier, Woodinville, Wash.
425,206.—BRAKE BLOCK—Butts & Edmonds, San Diego, Cal.
425,207.—RAILWAY RAIL JOINT—E. J. Byrne, Ft. Bowie, A. T.
425,122.—SAIL—John Cook, S. F.
425,126.—CARRIAGE TOP LIFTER—Jas. T. Dy-sard, Lakeport, Cal.
425,166.—CAR COUPLING—C. F. Francisco, San Diego, Cal.
425,169.—STEAM ENGINE VALVE—Wm. Gehring, San Diego, Cal.
425,174.—OPERATING ELEVATOR GATES—F. N. Hallett, Portland, Or.
425,386.—SAW MILL SET WORKS—R. E. Nevin, S. F.
425,106.—ELECTRIC ROTARY PUMP—E. I. Nichols, S. F.
425,349.—SPRINKLER—Jos. Oswald, S. F.
425,146.—REVERSIBLE WINDOW SASH—Reguin & Kingston, S. F.
425,085.—SAW GUIDE—T. Roberts, Eadonia, Washington.
425,110.—MARKER, ETC., FOR STONE WORK—Eliza K. Smith, S. F.
425,151.—TURNTABLE—J. C. H. Stut, S. F.
425,196.—SAW SWAGE—Wheeler & Newhouse, Corvallis, Oregon.

The following brief list by telegraph, for April 15, will appear more complete on receipt of mail advices: California—Cullen B. Bingham, Volcano, ore feeder; William H. Birch, assignor of one-half to C. J. Kaighin, S. F., sleeve; Thomas A. Evans, S. F., electric railway; Robert Franklin, Pomona, hose coupling; Windfield S. Getchell, San Jose, and R. E. French, Oakland, packing for stuffing-boxes; George Harvey, Forestville, stump-puller; John D. Hooker, Los Angeles, means for coating metal pipes; George O. Kohler, S. F., hose-hall gloves; Stillman A. Moulton, Campbell, tray for drying fruit; Louis Shafter, Oakland, ventilating outlet for refrigerator chambers.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast Inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

MOLD FOR MAKING CONCRETE CONTINUOUSLY.—Ernest L. Ransome, S. F. No. 424,656. Dated April 1, 1890. This invention relates to an improvement in the manufacture of concrete molds for sub-ways; and it consists essentially of a continuously-moving mold about which the concrete is constantly tamped while it is in motion. In a former patent, too, the same inventor is shown a mold adapted to be moved forward to a certain point and to remain stationary while the material is being tamped and compacted about it, after which the mold is loosened and again moved forward and again expanded after it has reached the point where the next section is to be completed. Mr. Ransome has found by experience that if the mold is moved continuously at a slow rate of speed while the work is being carried on, and without any contraction of its side for this purpose during the progress of the work, a great improvement in the work is produced. By the improved method, as the concrete is filled in and compacted, the friction caused by drawing the mold over and through the concrete serves to smooth it down, producing altogether a very superior and more finished result; and as no delays are necessary to move the mold and set it again for its work, it will be manifest that the work will be greatly accelerated and cheapened.

AUTOMATIC CABLE LIFTER FOR CABLE RAILWAYS.—John C. H. Stut, S. F. No. 424,532. Dated April 1, 1890. The invention relates specially to those devices which are used for raising the cable into the jaws of the grip of cable cars. Ordinarily, when the car is running, its stop is made by releasing the cable from the clamping effect of the grip but without dropping the cable from the jaws; but at certain localities—at turn-tables, the termini of the road, and at crossings—it is necessary to cast out the cable from the jaws, so as to wholly disconnect the grip, and it then becomes necessary when the car is to start again to lift the cable up into the jaws of the grip. It is the object of this invention to provide a simple and effective automatically operating device for raising the cable, and to this end the invention consists in a lifting roller mounted in the tube or tunnel under the cable, a lever in the tube and traversing the line of the grip-slot, so that as the grip passes the lever is thrown to one side, and suitable connection between the lever and the roller whereby the roller is raised to lift the cable into the jaws of the grip.

TURNTABLE.—John C. H. Stut, S. F. No. 425,151. Dated April 8, 1890. This invention relates to an improved construction for turn-tables which are specially applicable for use upon cable railways where it is necessary to transfer a car from one track upon which it arrives at the table to another track upon which it is moved in another direction after leaving the table. The object of the invention is to provide a turning-table so shallow in depth that it will allow the endless traveling cable to pass beneath it without change of direction while

a slotted tube or tubes are huilt into the top of the table, so that the grip may pass through after letting go the cable. By building the table of angle-iron or steel girders and top and bottom plates, and nailing the girder with the tubular channel which extends across the table, and forming the bottom of the channel in a peculiar way, the inventor is enabled to make the table very thin and strong and to build into the table the tubular channel or channels through which the grips and grip-shanks may pass when disengaged from the cable, while the latter is allowed to pass below the table without any change of direction from its ordinary line of travel.

SAIL.—John Cook, S. F. No. 425,122. Dated April 8, 1890. The essential object of this invention is to provide a sail of increased capacity and at the same time so constructed and arranged as to place the center of the wind force at as low a point as possible, whereby the greatest stability is given to the boat and the danger due to a sail of great dimensions avoided. This sail has the general configuration of an elongated parallelogram, differing therefrom only in a slight convergence of the sides of the sail forward, so that it is a little narrower at its forward end. There is a boom or spar at both top and bottom, and braces or stretchers separate these spars. These stretchers converge near the mast and the ends are secured upon an eyeholt from which a line leads down to the foot of the mast. By pulling upon this line, the stretchers are pulled in toward the mast, thereby straightening them and raising the upper boom or spar, keeping the sail tightly stretched. The pivotal connection of this sail with the mast enables it to be turned at right angles in front of the mast, when the boat is sailing before the wind or at any angle when the boat is beating or tacking. The stretchers or braces keep this sail very flat.

SAW-MILL SET WORKS.—Robert E. Nevin, S. F., assignor to the Vulcan Iron Works, No. 425,386. Dated April 8, 1890. This consists in the combination, with the carriage, of oppositely rotating ratchet-wheels connected, respectively, with pinions whereby the setting-gear is moved constantly in one direction, a lever and pawls whereby the ratchet-wheels are moved, stops by which the movement of the lever and the amount of set is regulated, and foot-levers and mechanism for operating the stops, and a means whereby the pawls may be thrown out of engagement with the ratchets.

Mining Share Market.

The mining share market has been active throughout the past week, with Chollar and Potosi the leaders on a break-neck down move. The whole market, like a kite's tail, moves in sympathy. Those of our patrons who took warning from our last week's remarks that although "this is a growing market yet there would be setbacks and, at times, in the leaders decided breaks," and sold out, did well. This opinion we still adhere to. It is based on important work now going on in the mines. The decline the past week was engineered by the pool through well-distributed cross-orders. While crossing orders to put prices down, they had brokers quietly taking in every share of actual stock offered for sale, paying higher than was bid. The pointers, as usual, worked the street to sell. Yesterday (Wednesday) the market closed very weak, but this morning it opened strong at an advance. After the regular Call, prices were still higher, with some stock, marking an advance of \$1 a share over yesterday's closing prices. Chollar and Potosi are still in the lead. The outside stocks are dull, with no trading of consequence reported in them.

It is now claimed that a gentleman who has disposed of his interests in the late Alaska Fur Company has joined the Comstock pool, throwing, so it is said, his interest with the north-end manipulators. From the mines our advices report that in the Potosi winze they are in high-grade ore on one side, with porphyry on the other side. The assay goes higher than was reported by Mr. W. E. Sharon and Co., Boyle when they inspected the mines last week. They reported two feet of ore assaying \$100 a foot. They also said that from appearance, with more work, the find might lead into a large body of rich ore. In Chollar there is an improvement. In Con. Imperial important work has been commenced, which this week's letter does not mention. This probably accounts for the five-cent assessment on the stock. A few months ago the company took out ore which they milled to test its quality, confirming our statement that on the upper level they had run into a ten-foot ledge of good to rich ore. Private advices state that in the Challenge-Confidence joint work now going on they ran into ore going over \$50 a ton. Official letters received from the two mines report that in the raise from the 300-foot level and the raise from the 500-foot level they are in good ore.

Our advices report a general improvement in the Gold Hill mines, although Crown Point's official letter reports the pulp assay the past week over \$4 a ton less than for the preceding week. Belcher reports being in ore on two levels. Our advices from the North End mines are of the most encouraging character. A Virginia City contemporary says: Already sufficient has been revealed in Ophir, Chollar, Potosi and Overman to revive such interest in the Comstock lode as will enable the energetic prosecution of work for another two years in the mines, during which time we may reasonably hope to strike other ore bodies. The work of draining the Gold Hill mines is another important factor in interesting speculators in mining. By draining those mines to the 2200 level a block of rich mineral ground, where-in very little prospecting has been done, 800 feet deep, 700 feet wide, and nearly a mile in length, will be added to our resources.

A TINY HOUR GLASS containing gold-dust instead of sand is the latest pendant for a chain.

MECHANICAL PROGRESS

The Future of Nickel Steel.

Some most remarkable statements, of great interest to the steel trade, were recently made by Mr. S. J. Ritchie, the well-known head of large American copper and iron interests in Canada. We cannot do better than reproduce them substantially as given:

"Within the last year nickel has come to assume a very important place in metallurgy as an alloy with steel. These results have been obtained in Great Britain, in France and in Germany. In France the cartridge shells are made of an alloy of equal parts of nickel and copper. In Great Britain large guns for the navy are being made of an alloy of nickel and steel. This has also been done in an experimental way in Germany, but heretofore and before the discovery of nickel deposits in Canada, the supply of nickel was so small and the price so high it would have been impossible to supply any considerable want, even had its utility been known. The Iron and Steel Institute of Great Britain is composed of the most prominent manufacturers of steel, both in Great Britain and upon the Continent, and it has at its meetings many American manufacturers. The discussions at its annual meetings represent the best talent and skill in everything pertaining to iron and steel that is to be had in the world, and its conclusions are the highest authority to which we can appeal.

"About one year ago this institute appointed one of its most competent members, a manager of the Steel Co. of Scotland, to make an extensive series of experiments with this alloy. This he did, and reported the results of his efforts to the meeting of the institute held in London May 8, 1889. The report has attracted the attention of steel manufacturers all over the world. No result approaching the high elastic limits and breaking strain of those reported from this alloy had ever before been seen. I myself saw a piece of this steel, made by the house of William Jessup & Sons of Sheffield, which contained about six per cent of nickel, and which was one inch square, that sustained a weight of 103 tons, and also showed a high elastic limit. These results were so wonderful that parties in Europe, who manufacture guns and armor plates for the three principal Governments, have offered to contract for our companies' entire production for a period of ten years. The proportions of copper and nickel in the ores belonging to our companies are just about those used by the French Government in the manufacture of cartridge shells. The proportions of iron and nickel are about what are used in nickel-steel, which it is proposed to use in the manufacture of guns and armor plate."

It is understood that Mr. Ritchie last summer visited the principal iron and steel works of Great Britain and the Continent, and that the above statements are based upon actual investigations. Certainly his statements indicate early and most important developments in the steel industry.

Amount of Friction Between Different Bodies.

One of the plainest statements in regard to this matter is given in one of Grimshaw's "Handy Little Books for Practical Men," about in the following terms: The ratio obtained by dividing the entire force of friction by the normal pressure is called the co-efficient of friction. Hence we may define the unit, or co-efficient, of friction to be the friction due to a normal pressure of one pound. In accordance with the above definition, then, the following values of the co-efficient of friction for different surfaces in contact have been established (the higher the numerical value of this co-efficient, the greater is the friction):

CO-EFFICIENTS OF FRICTION.

Iron on oak	0.22
Cast iron on oak	0.19
Oak on oak (fibers parallel)	0.48
Oak on oak (crossed)	0.10
Cast iron on cast iron	0.15
Wrought iron on wrought iron	0.14
Brass on iron	0.16
Brass on brass	0.20
Wrought iron on cast iron	0.19
Cast iron on elm	0.19
Soft limestone on same	0.64
Hard limestone on same	0.38
Leather belts on wooden pulleys	0.47
Leather belts on cast iron pulleys	0.28
Cast iron on cast iron (greased)	0.10

Pivots or axles of wrought or cast iron on brass or cast-iron pillows:

1. When constantly supplied with oil.....0.05
2. When greased from time to time.....0.08
3. Without any application.....0.15

To TEST ENAMELED IRONWARE FOR LEAD, take ordinary vinegar, which dilute with four times its weight of water, and to which add five per cent of table salt. The solution is poured into the vessel and left in it for 12 hours at ordinary temperature. At this time the liquid is examined for lead by means of sulphide of ammonium. If the liquid acquires a black or dark-brown color, the enamel is dangerous; if the color is only light-yellow or light-brown, the vessels may be used.

BRONZINO IRON OR STEEL.—Some German artists have introduced a method of bronzing iron or steel surfaces in such a way as to prevent the possibility of rust. The object to be acted upon must be free of all oxidation or other impurity, and is exposed for two or three

minutes to the vapors of a heated mixture of hydrochloric acid and nitric acid, in equal proportions, at a temperature of from 550° to 650° F. After cooling, the objects are rubbed over with vaseline and again heated until the vaseline begins to decompose; this treatment with the vaseline is repeated once. Should a lighter coloring be desired, it is produced by mixing acetic acid with the other acids.

A NEW KIND OF WATER PIPE, which has recently been put upon the European market, is described in a German journal. The pipes are made of glass, about 0.2 inch thick, and have an asphalt coating about 0.4 inch thick, with fine gravel on the outside. The purpose of the asphalt coating is to prevent fracture of the pipes. The latter are designed to supplant wooden, earthenware or cement pipes, and also lead and iron service pipes, the advantages claimed for them being thorough resistance against the moisture in the ground, and against the action of acids and alkalis. They are, moreover, impervious to gases, and are claimed to afford little opportunity to the formation of incrustations. What results the pipes will give in practice remains to be determined. Glass pipes have been made in this country; but the asphalt covering is something new, and no doubt a very great improvement.

STEAM TRAMWAYS ON CITY STREETS.—Steam tramways are very common in English cities, but do not meet with much favor in this country. They are speedy, emit neither smoke nor steam, run noiselessly, and altogether give general satisfaction. The engine and boiler is of an ordinary type and is hoisted in. The exhaust steam is condensed by being passed through about 300 copper tubes on the roof of the engine, the water of condensation flowing to a feed-tank and is pumped, still hot, into the boiler. Coke is burned, the average consumption being 10 to 15 pounds per mile, and the total working expenses, including wages, depreciation of engines and other items, are 8½ cents per mile.

TEN-WHEELED LOCOMOTIVES.—The Baldwin Locomotive Works are to build for the Erie Railway Company three more of the large ten-wheel passenger locomotives of the same type as those recently built for that road. The *Railroad Gazette* says these engines represent the heaviest class of passenger motors in service, and their use increases the belief that the six-wheeled coupled locomotive will be the engine adopted for heavy express service in the near future. These locomotives have 20 by 24 inch cylinder, 65-inch drivers, weight 127,000 lbs. exclusive of tender, and have 97,000 lbs. available for adhesion. They are adapted for burning anthracite fuel.

BRICK-MAKING DEVICES.—In the manufacture of brick, improved devices save one-tenth of the labor, and in the manufacturing of fire-brick 40 per cent of the manual labor is displaced. Some idea of what this means may be gained when it is shown that something like three thousand millions of brick is the annual output of the United States, employing a capital of about \$300,000,000. There is no other country in the world where brick-making is carried on so extensively, or with so much skill and profit, as in the United States.

LOCOMOTIVES FOR INDIA.—Fifty locomotives are being erected on the Clyde for the South Indian Railway Co., Limited; the whole are to be shipped within the next six months. It is further stated in regard to India railways that a proposal is under consideration, by the East Indian Council, to convert all the narrow-gauge lines of railway in India to broad-gauge lines, at a cost of about \$100,000,000.

WELDING STEEL TO BRASS.—It is said that successful experiments have been made in welding steel to brass by the electric-welding process, and in such a manner that the steel will split longitudinally without affecting the welding. The aim is to weld brass boiler-flues to steel safes, which is of much importance, as steel will stand a higher degree of heat than brass.

NEW USES FOR RAWHIDE.—The new-process rawhide, which is being introduced for gears so satisfactorily, is also being made into chisel-handles and mallets. In this shape it finds admirable adaptation, being handsome, receiving a fine polish, light, elastic, and may be turned or molded into any shape.

BLAST FURNACES.—The productive capacity of blast furnaces in the United States continues at about 175,000 tons a week, having hovered about that figure for the past 60 days. The number of rolling-mills and steel works is 445, and 11 are now in process of construction.

IRON BOLTS exposed to the action of rain-water in bridge over the Thames have in 25 years been eaten away from an original diameter of 3ths to one of 5 16ths of an inch, which is a reduction in area of cross-section of 75 per cent.

ENGLISH STOVES.—English stove manufacturers construct the bottom grates for their fires so as to be adjustable, and thus they can make a fire shallow or deep, or may spread a thin vertical fire against a front grate.

PROBABLY the first compound locomotive was built by William Baxter, in Newark, N. J. It was in practical use as long ago as 1870.

SCIENTIFIC PROGRESS.

Steady Exhaustion of the Earth's Mineral Supplies.

The enormous demands of modern industry are making most rapid inroads into almost all the various minerals of the earth—demands far greater than have been made in any past century. The *Journal of Man*, in alluding to this matter, says:

It is not merely that the absolute quantity of the earth's mineral wealth used up yearly by civilized races is large, but that the proportion of this annual consumption to the entire store is extravagant, in view of the length of time over which the store ought to last, unless the future of our race is to be much briefer than we have any reason to expect. Let us take man's use of the earth's buried stores of coal and oil as illustrations of the processes of exhaustion. It has been estimated that beneath the earth's crust there lie about 8,000,000,000 cubic yards of coal at depths rendering them available for the use of man; in round numbers this would be a little over 7,000,000,000,000 tons of coal. Of this store Great Britain has available for use about a fifth part, or, more exactly, according to the best estimates, 145,000,000,000 tons. This is an exceptionally large supply for an area so small. Yet Great Britain, which has not yet reached either the fulness of its growth or the full development of its civilization, consumes already each year more than 150,000,000 tons of coal, a rate of consumption which would fully exhaust her supply in a little over 900 years—a mere moiety of time compared with the duration of man on the earth in the past.

Thus a people who may be regarded as typical of modern civilization, supplied by nature with a hundred times more wealth in coal than the area of their country would entitle them to expect, are spending their share of this form of hurled wealth (really buried life) at such a rate that the exhaustion of the region they occupy will be completed in less than a thousandth part of even that period (a million years) which science regards as the time unit by which the earth's future is to be measured. It is not likely any other region of the earth will remain much longer stored with coal than Great Britain. Elsewhere there are immense supplies, and as yet, where these large supplies exist, the human race is not so closely crowded as it is in Great Britain; but wherever the earth is thus well stored, the population is growing in density, and at rates showing that in less than two centuries the population per square mile will be greater than in England.

So far as coal is concerned, the outlook is that the earth's buried stores will be entirely exhausted in less than 2000 years. If we remember that the consumption of coal is an index of the rate at which the other mineral stores are being exhausted, that coal is not merely being used in the direct work of civilization, but in procuring the materials by which that work is continued, we cannot fail to see that other portions of the earth's stored wealth must also be undergoing a similar process of rapid exhaustion. As a matter of fact, all other forms of stored wealth are also being exhausted at speedier rates; many are being exhausted far more rapidly even than coal, and some are being exhausted so rapidly that their future duration may be counted by years rather than by centuries.

THE HEIGHT OF SEA WAVES.—The theory of the late Capt. Scoresby as to the height of sea waves appears to be untenable, judging by the reports of the fearful weather which has recently prevailed on the Atlantic. We now know, says *Iron*, London, that powerful passenger steamers have had their hulls shattered, their deck ladders torn away, their hosts wrenched from their davits and the iron davits themselves twisted like pin wire. Now, the boats of such vessels are swung high aloft above the deck. Therefore the seas, which smashed them into match-wood and twisted the davits from which they were torn, must have been of greater elevation than 26 feet (the maximum height according to Scoresby). Not very long ago the *Servia* was the largest and most powerful passenger steamer afloat. Seen on smooth water in her ordinary trim, her towering height appears to render her secure against being hoarded by any wave, yet on one occasion a leaping sea struck her with such violence that it flattened one of her huge funnels. The height of the wave must have been nearer 50 than 26 feet. The other week the Dundee screw-liner *Croma* arrived at New York in a sea-battered condition, and reported fearful weather. She had actually shipped a sea down her funnel—an elevation of 56 feet above the ordinary water level. If steamers having a fair degree of buoyancy meet with such experience, what wonder is it that heavy cargo steamers like the National line steamer *Erin*, their decks loaded with cattle, occasionally go to the bottom?

TRAINED SENSITIVENESS.—It is very remarkable to observe the keenness to which the various senses can be educated. Some blind persons can by the sense of touch to their tongue guide a thread into the eye of a needle. Some watch-makers can ascertain if a watch is running accurately within reasonable limit by holding the watch to their ear and at the same time watching the vibration of the pendulum of a standard

clock. The carefully-trained pilot in a fog or dark night will depend upon his hearing to tell him when he is approaching an invisible object of any considerable size which projects above the water, as he will instantly notice a change of echo of the noise made by his vessel. Some engineers, trained to the sound of their engine, will notice a very slight difference in the working of any part by the change of sound, even when they are engaged in other work and apparently not listening to any noise.

A PROBLEM IN ASTRONOMY POSSIBLY SOLVED. The curious suggestion made by S. E. Peal of Assam, India, in demonstrating that Greenland is covered by a huge ice cap, may have unconsciously solved an interesting problem in astronomy. It has long been noticed that the polar caps of Mars are not diametrically opposite, the southern one not being centrally placed over the axis of rotation, and it now appears that a like anomaly may exist on the earth. In Antarctic waters are seen immense flat-topped bergs of ice 2000 feet high and several miles long, which are evidently fragments broken from a permanent cap directly over the south pole; while in the Arctic regions thin field ice preponderates and hears out the assertion that the north pole is covered by a deep sea, quite free from islands, in which the ice finds no anchorage, and is floating and temporary. Nansen's recent expedition, therefore, may result in proving that the Greenland continent underlies one of the two polar ice caps of the earth, and is giving a clew to the condition of Mars by showing a closer resemblance to our planet than had been before observed.

COMPRESSIBILITY OF WATER.—The latest volume of the reports of the Challenger expedition contains a determination, by Prof. Tait, of the compressibility of fresh and salt water at different temperatures and pressures. It is shown that the depth of a sea about six miles deep is reduced 620 feet by compression. If the ocean were incompressible, the level of the surface would be 116 feet higher than it is at present, and about 2,000,000 square miles of land would be submerged. The average compressibility of salt water is about 0.92 of that of fresh water. At atmospheric pressure, the temperature of minimum compressibility of fresh water is 140 degrees F., and of salt water 133 degrees. The temperature of the greatest density of water is reduced to freezing point under a pressure of 2 1/4 tons per square inch, the freezing point then being 27.78 degrees.

ICE AS A CONDUCTOR OF HEAT.—That ice is a conductor of heat is proved by the fact that if a mass of transparent ice be fashioned in the shape of a lens, it will act just as a burning-glass; and with such a lens, combustible substances like cotton, gunpowder, etc., may readily be set on fire if they are held at the focus of the ice lens and the solar rays are directed upon them by properly holding the lens to receive and transmit them. Of course ice, in its normal condition, is a very poor conductor. But there is no substance that can be said to be absolutely a non-conductor. They all conduct more or less of it, differing only in the degree of conductivity. Ice, however, will transmit heat quite freely.

ANOTHER SACCHARINE SUGAR FROM COTTON-SEED MEAL.—The latest reported discovery in connection with the cotton-seed comes from Germany, where it is said a process has been discovered for extracting sugar from cotton-seed meal. The sugar is of a very superior grade, but cannot be sold in competition with the ordinary article. It is said to be inclined to ferment or sour, and hence better for use in preserving fruits. It is said to be 15 times sweeter than cane sugar.

THE ELEMENTS.—There appears to be a growing tendency among chemists to regard the different "elements" as simply varying arrangements of one original atom, produced at successive stages and under different conditions in the process of cooling. Evidence in favor of the hypothesis is claimed by the fact that some earth elements seem not to have yet been formed in the sun, while others are absent from still hotter stars.

ARTIFICIAL MALACHITE.—Some beautiful specimens of artificial malachite were recently presented to the French Académie des Sciences. They are apparently well adapted for ornamental work, and have been produced by a process discovered by Prof. de Sohulten of the University of Helsingfors. It consists in evaporating a solution of carbonate of copper in carbonate of ammonia.

THE DOG.—At a late meeting of the London Zoological Society, Mr. A. D. Bartlett read a paper going to show that the varieties of the domestic dog owe their origin to wolves and jackals, the habit of barking having been acquired under the influence of domestication.

SACCHARINE DETRIMENTAL TO HEALTH.—The use of saccharine in France has been restricted, as its antiseptic nature, when used in large quantities, retards digestion, neutralizing the gastric juice.

THE REINDEER.—Recent efforts have lately been made to acclimatize the reindeer to Germany for various purposes; but the heat of the summer was too great for the animals.

A "BLOOD" ROSE.—It is said that a new rose has been produced in soil made from blood.

GOOD HEALTH.

Danger in Dust.

MESSRS. EDITORS:—As there are a great many people who do not believe in the existence of germs in the air, I will give you an instance that came under my observation which ought to convince the most skeptical.

My brother-in-law, a carpenter, took a contract to pull down and rebuild the old Arcade building situated on Second and J streets, Sacramento. In doing this work he inhaled a great deal of dust, and very soon afterward began to complain of shortness of breath, then smothering spells, in which he was unable to breathe unless he was fanned constantly and the windows kept open.

The doctors pronounced it "heart disease" and advised his family not to leave him alone, as he was liable to die at any time.

He lingered along for two years, and about a month before he died, began to cough up blood and mucus. His left lung was very sore and painful; his physicians said he had taken cold and had pneumonia. After pointing his lungs three days, in a violent fit of coughing he ejected a white insect an inch long; it had four legs, a prothorax, and eyes that resembled two tiny black heads.

The medical fraternity gave it as their opinion that he inhaled the germ or egg in the dust of that building.

READER.

Secret of the Skin.

Did it ever occur to you, says a contemporary, that the skin wants exercise and gets very little? Nothing is a better tonic for the complexion than a brisk cold sponge bath on rising, followed by vigorous rubbing with a dry towel, not too coarse—the face and neck receiving their full share of the friction unless the skin is very sensitive, in which case the bare hands may be the instrument instead of the linen. This sets the blood to moving briskly and electrifies the system. At bedtime a warm bath may be taken, and the face should be washed slowly, carefully and thoroughly with warm water and castile soap. The oily matter exuding from the skin catches minute particles of dust which cannot be removed in any other way, and many eruptions on the face are caused by nothing else than neglect of this simple precaution. After this wholesome cleansing, dip the face into a basin of clear, cold water, opening and shutting the eyes under the surface, and the flesh will be left firm and healthy. The entire process will take barely ten minutes in the morning and twenty at night, and can, if needful, be taken from the regular sleep, the bath being quite as restful and refreshing.

Friction of the Skin.

As of further value for friction of the skin, Dr. A. Penykoff of Berlin, through a medical journal, advises treating intermittent fever with friction along the spine. Many years ago so many cases of intermittent fever occurred in his regiment, stationed in Serbia, that the quinine supply was failing, when rubbing the back twice daily with ample ointment was ordered for certain patients. The day after, the usual attack did not appear. The treatment has been frequently employed since, and three-fourths of this physician's cases have done very well without any quinine at all.

MILK FROM A DISEASED COW.—The Fresno Republican recently gave a brief report of a case in that neighborhood where a child was taken seriously ill. The physician whom the mother called in decided that the illness had been caused by drinking the milk of a diseased cow, and a ringworm on her arm was ascribed to the same source. The family had been using milk from a neighbor's cow which was afflicted with an ulcer in her hind quarter, and it is believed that the poisonous matter in her blood had tainted her milk. A complaint was made to the City Board of Health, but inasmuch as the cow and the owner lived outside the city limits, the board had no jurisdiction. The man had stated to several people that his income from the milk of the diseased animal was \$15 a month. Section 383 of the Penal Code of California reads as follows: "Every person who knowingly sells or keeps or offers for sale, or otherwise disposes of, any article of food, drink, drug or medicine, knowing that the same has become tainted, decayed, spoiled or otherwise unwholesome or unfit to be eaten or drunk, with intent to permit the same to be eaten or drunk, is guilty of a misdemeanor."

DEATHS FROM LIGHTNING.—The majority of the deaths from lightning occur in the level, open country. Trees, villages and thickly built-up towns and cities, by their projections into the air, which serve as conductors, protect the inhabitants from direct strokes. The loss of life annually by the lightning stroke throughout the world is great. In European Russia, in the seven years between 1870 and 1877, 2270 persons were killed. In Austria, 1700 persons were killed during the same period. Prussia averages 70 persons annually. In France, 10,000 persons were struck in 29 years, with 2252 deaths. In 1870, there were recorded in the United States 202 deaths from lightning.

THE DEADLY COLD BED.—If trustworthy statistics could be had of the number of per-

sons who die every year or become permanently diseased from sleeping in damp or cold beds, they would probably be astonishing and appalling. It is a peril that constantly besets traveling men, and if they are wise they will invariably insist on having their beds aired and dried, even at the risk of causing much trouble to their landlords. But the peril resides in the house, and the cold "spare room" has slain its thousands of hapless guests, and will go on with its slaughter till people learn wisdom. Not only the guest but the family often suffer the penalty of sleeping in cold rooms and chilling their bodies at a time when they need all of their bodily heat by getting between cold sheets. Even in warm summer weather a cold, damp bed will get in its deadly work. It is a needless peril, and the neglect to provide dry rooms and beds has in it the elements of murder and suicide.—*Ex.*

HYPNOTISM.—A number of London medical men have united to form a hypnotic society, the purpose of which will be to prevent by law public exhibition of mesmerism and hypnotism. Another object will be to study privately and in a scientific manner the phenomena of those morbid states.

USEFUL INFORMATION.

THE VALUE OF EARTH-WORMS.—Darwin estimated that worms, by swallowing earth for the sake of the vegetable matter it contains and forming castings, bring to the surface as much as ten tons of earth per annum on an acre. Worms are great promoters of vegetation by boring, perforating, and loosening the soil, and rendering it pervious to rains and the fibers of plants by drawing straws and stalks of leaves and twigs into it, and most of all, by throwing up such infinite numbers of lumps of earth called worm casts, which form a fine manure for grain and grass. The earth without worms would soon become cold, hardbound, void of fermentation, and consequently sterile; this has occurred in many cases where the worms have been either accidentally or intentionally destroyed, and the fertility of the soil thus lost has only been restored when the worms had again collected and resumed their fertilizing work.

A ROPE THAT WILL FLOAT.—A cork core floating rope has been invented. The inventor claims that his floating rope of one-inch thickness will stand a strain of more than 1000 pounds. The rope consists of a core of small round corks, about three quarters of an inch long, placed end to end, around which is braided a network of cotton twine. This is surrounded by another layer of strong cotton twine, braided in heavy strands, which is about a quarter of an inch thick. The rope is very soft and pliable, and even after being tied into a small knot will return to its original shape. It can be used in life lines on life rafts, and as a heaving line to tie heavy hawsers to. At a life-saving station such a rope would be very valuable.

ANOTHER cheap and simple fuel discovery is announced in Germany, which possesses advantages that will tend to bring it into universal use. The process, which has been patented at Munich, Bavaria, converts turf into a firm and highly valuable combustible material resembling anthracite coal and burning without smoke or odor. Through a successful combination of several oft-tried processes, the cost of production has been brought down to a point that will admit of a patent tariff entering into competition with coal.

WRITING INK.—C. H. Vieldt of Brunswick, Eng., who has written very exhaustively on all kinds of ink, divides the black writing ink into three varieties, viz., "galls ink," ditto with logwood, and ditto with indigo. The best quality of these is, chemically, a ferrous-ferri gallate, or tanno gallate of iron. It is made by mixing, according to one maker, for 12 gallons of ink: 12 pounds of bruised blue Aleppo galls; 5 pounds of alaphate of iron (green copperas); 5 pounds of gum senegal, dissolved in 12 gallons of water.

A NEW PATENT UMBRELLA will soon be on the market. Its distinctive feature will be a stick grooved to form a bed for each one of the frame ribs. The result of this structural arrangement is said to be a clear gain in point of weight and bulk upon the regulation article. Supporters of this new patent claim that an umbrella so made is, when tightly rolled, as light, as firm, and as trim as a medium-sized walking-stick, while it loses nothing in point of strength and durability.

THE LATEST NICKEL IN THE SLOT has wonderful possibilities. It is connected with the telephone, and by dropping the required coin in the toll-box attached to the phone, the connection is made with central without the prolonged ringing that usually precedes a conversation with that dignitary. At least, such miraculous powers are claimed for this new invention.

TO SOFTEN IVORY.—Dr. Lankester recommends phosphoric acid, of the usual specific gravity, which renders ivory soft and nearly plastic. When washed with water, pressed, and dried, the ivory regains its former consistency, and even its microscopic structure is not affected by the process.

ENGINEERING NOTES.

The Cantilever Principle.

The cantilever principle in bridge-building, which is now so universally employed in such structures, is not as new as many suppose. A New Yorker named Thomas Pope, as early as 1811, published a short treatise on bridge-building which was primarily designed to set forth the advantages of a "Flying Pendant Lever Bridge" which he had designed for a connection between Brooklyn and New York. This book is only found in a few private libraries of to-day, and has recently been fished out of the dust of 80 years by our contemporary of the *Manufacturer and Builder*, from which journal we collate these facts. The bridge was to consist of a single span 1800 feet long, the center of which would be 233 feet above high water. The span of the Brooklyn bridge is only 1500 feet. The plan described is identical in principle with what is now designated as the "cantilever"—an expression equivalent to "pendant lever," as employed by Mr. Pope.

This fact is all the more interesting at this time, since this particular type of bridge structure is generally believed to be of comparatively recent origin and to have originated with the American bridge-builders of the present day. Notable examples of this form of bridge structure exist in various parts of the world, notably among which are the recently constructed steel railway bridge at Niagara Falls and the great steel bridge just opened for traffic over the Frith of Forth in Scotland.

To illustrate the practicability of his ideas, Mr. Pope constructed a model of half the proposed bridge, which was nearly 50 feet in length, on a scale of three eighths of an inch to a foot. The weight borne at one time by the unsupported arm of this diminutive model was ten tons, which astonished the mind of every beholder. The model was afterward completed by adding the other arm, making the model 100 feet in length. From this work the reader will be able to appreciate the completeness with which this engineer had grasped the fundamental principles of the cantilever system in bridge-building.

Mr. Pope's plan consisted of a bridge in which the superstructure consisted of projecting beams or levers fixed at one end to the abutments or piers and free at the other end. The best that can be said in behalf of builders of the present generation is that they have revived an old idea and that the revival is to be credited principally to American engineers, who have been the first to appreciate the merits and adopt the system so perfectly set forth by their countryman of 1811, who lived at a time when his genius was not properly appreciated.

A very good idea of the sustaining power of bridges built on the cantilever system may be formed from the apparently authorized statement that each cantilever of the Forth bridge will sustain six of the largest iron-clads in our navy.

A RAILWAY TUNNEL is now proposed for connecting Brooklyn with New York City. It is proposed to construct it under East river, between South Sixth street, Brooklyn, and Broome street, New York. The work is already taking definite form, the contract for building it having, it is stated, been awarded to the American Tunnel Construction Company. The total length of the tunnel is to be 2890 feet, and it is promised that it will be completed within two years after securing the consent of the authorities of the two cities, which condition, however, gives an element of indefiniteness to the enterprise.

LARGE DAM IN INDIA.—The Tanea reservoir, situated about seven miles from the Atgann station, will consist of one great dam spanning the beds of two rivers with a length of nearly two miles. It is composed entirely of rubble masonry; the height of the center will be about 65 feet. The work is progressing with considerable rapidity, and the huge wall, at last accounts, required only to be raised from 15 to 20 feet to be finished. The progress of the work is so far satisfactory that, if the duct works are ready by March 1, 1891, the reservoir will be ready to give the water.

IMMENSE BRIDGE SPANS.—The span of the Brooklyn bridge is 1500 feet. The two spans of the Frith of Forth bridge are 1710 feet each. M. Stoffel, the well-known French engineer, proposes a bridge of remarkable construction for the mouth of the Tagus, at Lisbon, Portugal. It would be nearly twice the length of the Brooklyn bridge, while its spans would be to those across the East river as nine to five, or almost twice as great.

A NEW STYLE OF ELEVATED ROAD for rapid transit has recently been proposed to a party of Chicago capitalists by a gentleman named Goudie. His invention, he claims, will greatly improve the speed and decrease the cost of transportation. Runners much like those of sleighs are to be used in place of wheels, the latter being part of the track, and their revolution, aided by oil from the moving train, is one of the leading aids in increasing the velocity.

THE NICARAQUA CANAL.—The work upon this enterprise, notwithstanding reports to the contrary, is being pushed in a most active manner. A very large contract has just been let

to C. P. Treat & Co. of this city. This contract calls for the building of ten miles of railroad from the mouth of the San Juan to the canal locks of the Atlantic divide. The work will cost from \$150,000 to \$200,000, and will be completed about four months. This road is merely a temporary work for use in constructing the canal. When the railroad is completed there will be transported over it the machinery to be used in excavating the great ship-locks and in cutting through the Atlantic divide.

ELECTRICITY.

A NOVEL and simple form of electric battery has recently been invented in Italy. As described in the *Revisita Technica Science* it consists of conical vessels of cast iron and porous earthenware, with nitric and sulphuric acid. An iron cone is placed point downward in a stand, and is partly filled with strong nitric acid. Into this there is placed a cone of porous earthenware containing dilute sulphuric acid. Then follows an iron cone surmounted by an earthenware one, and so on in a series, each vessel containing its respective acid. It follows that the inner surface of each iron vessel is bathed in nitric acid, and becomes passive, acting the part of the platinum or carbon in an ordinary cell. The outer surface is attacked by the dilute sulphuric acid, and takes the place of the zinc. There are no connections to make, the simple building of the pile putting all the parts into union. The earthenware cones are 8 inches in diameter and 4 inches in height, and contain 550 cubic centimeters of 10 per cent sulphuric acid solution. The iron vessel contains 110 cubic centimeters of nitric and sulphuric acids, the latter being three times the volume of the former. Sixty elements arranged in two piles have a resistance of 104 ohms, an electro-motive force on open circuit of 81 volts, and on closed circuit of 45 volts, with a current of 4.410 amperes. After five hours the difference of potential falls to 28 volts and the current to 2.7-10 amperes.

ELECTRICITY AS A MOTIVE POWER FOR STREET CARS.—It was stated in a recent address at the Jefferson Physical Laboratory at Cambridge, Mass., that "as a motor-power for street cars, electricity has many advantages. Electric cars can be run at any speed up to 18 miles an hour or even higher. Cars running at high rates of speed are less dangerous than those running at low rates. People are more cautious. If all the cars of the West End Company had been run by electricity during the past year, there would have been a saving of over \$1,000,000 in money and 100 years of time to the persons using them. The adoption of electricity means cleaner streets and consequently a lower death rate. The system in this city and Boston is not perfect as yet. One improvement soon to be introduced is to divide the overhead wire into sections insulated from each other. In case of an accident to one section, travel will not be delayed on the others. In 1888 there were ten electric roads in this country in operation. To-day 30 per cent of the street-car roads use electricity or are preparing to do so. Among the proposed improvements by the West End Company are larger cars. Some 50 cars are now building, some on the Robinson radial system, others with a swivel truck at each end. The final means of propulsion in all street cars will be electric motors, and these motors will probably be run by storage batteries."

ANOTHER ELECTRIC SAFETY DEVICE.—Mr. A. P. Hafner of New York has invented a very simple little contrivance called a protector, which is made of German silver or fuelie wire, and the coil of an electric magnet. By this device the danger of fire or electrical shocks in telephones or messenger calls is said to be entirely removed. Whenever an abnormal current is introduced into the building by reason of telegraph, telephone or other wires coming in contact with electric-light lines, the coil of the magnet becomes magnetized, attracting the armature, the instrument protected are out from the circuit, and the abnormal current is carried direct to the ground. It is concentrated in the German silver wire, which causes it to fuse if the current is dangerous, and completely opens the line.

DEATHS FROM ELECTRICITY.—Capt. Eugene Giffia, manager of the Thomson-Houston Co., in a recent lecture before the Jefferson Physical Laboratory of Cambridge, in speaking of the dangers attending the use of electricity, cited statistics to show that in New England there have been only five deaths by electricity in ten years, and of these five, four were employees. In the same time there have been 5241 deaths from railroad, and of these, 2902 were not employees. Why not tear up the railroad as well as pull down the telegraph wires?

IMPROVEMENT IN INCANDESCENT LIGHTS.—A new improvement in incandescent lights, it is stated, is being introduced by the New Bedford Gas-Light Company, whereby the burners can be turned down without putting them out entirely. They are on exhibition in the company's office with a meter attached in a glass case, and it is seen that the meter revolves more slowly when the lights are dimmed. Customers therefore pay for the amount of light they use.



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Saturday, April 19, 1890.

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Passing Events.

With the cessation of rains, active work has been resumed in the various mining camps of the State, where little else than pumping has been done for months. In the mountains there is still considerable snow and a great deal of water in the ground. Still money is becoming more plentiful and business begins to show the effect of it.

The molders' strike in our local foundries still continues, though the men seem now willing to arbitrate on certain points, notably the limitation of work and the apprentices question. However, there is as yet no special change in the situation.

There are rumors of the finding of placer gold and quartz discoveries in the Grand canyon of the Colorado. Coarse gold is reported on the bars. Men are going down from Denver, but it will be found a pretty hard region to prospect and mine in, although there is plenty of water.

The arrival at the Clark of the casting of the glass for the 40-inch crown glass of the proposed telescope for Southern California shows that the work is going on in the preparation of the greatest of lenses, although at one time it was supposed the project had been abandoned.

The Silver Question.

The mining industry of the United States, and also the farming industry, which is largely dependent upon the market value of silver, are to be congratulated upon the advance in the price of the metal. In our long statistical review of the silver problem, we gave interesting data showing that the world's silver requirements were in excess of the output, and that with proper legislation the price of silver could be readily advanced to par. The present advance in the market is confirmatory of our then expressed views, and if the present Congress should pass an Act based upon Senator Jones' bill, it is only a question of a short time when the metal will be remonetized, not only in this country but by the European Governments, and particularly so now that that great opponent, Bismarck, has been retired in Germany. There does not appear to be the least doubt expressed but what a silver bill will be passed by Congress. At this writing, it is said that the Senate and House committees arbitrating on the respective bills have agreed on the Senate bill to purchase \$4,500,000 worth of silver monthly, looking to free coinage in the future. The only difference between the committees is how the certificates to be issued in payment for the bullion are to be redeemed. The Senate committee wants them redeemed in lawful money of the United States, while the House committee stands out for their redemption in silver bullion. If the former course is pursued, then the metal is at once raised as a currency medium on a par with gold; but if the certificates are redeemed in bullion, then it and the certificates become a speculative gamble with fluctuating value. With uncased bullion piled up in the Treasury vaults, the situation becomes a menace to European and other countries, which will put off, indefinitely, the remonetizing of silver abroad.

At this time, with an international bimetallic conference growing in favor abroad, it behooves bimetallicists in this country not to accept any proposition that is likely to throw discredit on the present movement looking to the remonetizing of silver. That there is abroad a strong growing feeling in favor of bimetallicism cannot be doubted, for our leading exchanges reflect this change of heart. Even Samuel Smith is reported by cable to favor an international monetary conference looking to bimetallicism. But probably the strongest move in this direction is that of the English mill hands, who have signed by thousands and forwarded to the House of Commons the following petition:

That the well-being of the industry in which we are engaged depends largely upon trade between Great Britain and silver-using countries; that the loss and disturbance to the free flow of trade resulting from there being no fixed connection between our money and the silver moneys of our customers in India, China, Japan and elsewhere, operate injuriously upon the cotton trade; that it is most important there should be no hindrance to the profitable development of the great industry with which we are connected, so that full and regular employment may be provided for our constantly increasing population. Your petitioners therefore pray that your honorable House may be pleased to approve of a conference of the chief commercial nations of the world being called to consider whether a bimetallic system can be re-established by international agreement.

A 40-inch Telescope.

The casting for the object-glass of the proposed 40-inch telescope for the University of Southern California has been completed by Mantois of Paris, and has arrived at the establishment of the Clark Bros., Cambridge, where it will be ground during the next two years. This crown glass is 40 inches in diameter, the largest ever made, exceeding the glass of the Lick telescope by four inches. The maximum thickness when completed will be about two inches. Since the completion of the Lick telescope, it has been found possible to cast larger glasses at less cost. The flint glass for the proposed telescope has not yet been made, but that is comparatively easy to do. It is the intention of the University of Southern California to place this telescope, when completed, on the summit of Wilson's Peak, back of the Sierra Madre villa, Los Angeles county. This peak is nearly 6000 feet high.

When Mr. Alvan G. Clark was here last year, he visited the peak with a good telescope and looked at many test objects, and it was his

opinion that the selection of the site was very promising. He said also, by the way, that if he ground and finished the big lens he should do it in California. The University of Southern California is a Methodist institution, which already has a good deal of money. Mr. Spence, a wealthy resident of Los Angeles, is credited with being the man who will furnish most of the money for the proposed observatory.

Point in Favor of Mining Shareholders.

The case of Fox vs. Levy is an action brought to compel the directors of the Savage Mining Company to conform to that section of the Act passed by the Legislature in 1880, which reads as follows: "It shall also be the duty of the superintendent to file with the secretary a weekly statement, under oath, showing the number of men employed under him and for what purpose, and the rate of wages paid to each one. He shall attach to such account a full and complete report, under oath, of the work done in said mine, the amount of ore extracted, from what part of the mine taken, the amount sent to mill for reduction, its assay value, etc." While the superintendent complied in part with the above section of the law, he neglected to give the value of ores at the mine, that is, the assay value of the ore when first discovered in the drift, and next the assay value of samples taken from the car when sent to the mill. Levy entered a demurrer to the complaint, which was sustained by Judge Shafter, before whom the case was brought; but in the second action brought by the plaintiff Fox to enforce the law, Judge Shafter overruled the demurrer of the defendant, and now the case will go before him on its merits. In the second presentation of the case the facts were brought out more fully, and to the judge's credit, he said, he overruled his former decision. There can be no doubt that with a decision in favor of the plaintiff, mining on the Comstock will have to be carried on more openly, which will disarm criticism and create with the public greater confidence in the shares of the mines.

Work for the Engineers.

California will get this year in the river and harbor appropriations about \$650,000, a larger sum than ever before allowed the State. For Oakland harbor not less than \$250,000 has been allowed. Napa creek gets \$110,000; Redwood creek, \$3000; Humboldt bay, \$80,000; Wilmington harbor, \$40,000; the San Joaquin river, \$75,000. The sum of \$50,000 has been set aside to make surveys for a breakwater at Santa Cruz and at Redondo beach. For surveys of Suisun bay and the mouth of the Sacramento, \$14,000 has been allowed.

As far as the improvement of the Sacramento and Feather rivers is concerned, it is found to be impossible to make an appropriation until the engineers make examinations, surveys, maps and estimates, and submit them to Congress. This has been ordered done, and the money for the work will be taken from the contingent fund. Most of the money for the San Joaquin river will be expended in the repair of the Paradise cut-off and Laird's slough. The State ranks third as far as securing appropriations are concerned. For Oregon, for improving the Columbia, about \$1,000,000 has been appropriated. This amount includes the sum of \$500,000, allowed for the continuance of the jetty work at the mouth of the river. For Coos bay, it is understood that \$120,000 has been allowed, which is to include the continuance of the work on the jetties. A survey looking to the removal of shoals in the upper harbor is also authorized.

Yaquina bay gets \$120,000, and \$500,000 is allowed to commence work on the jetty at Sinslaw bay. For continuing work at the mouth of the Coquille river, \$30,000 is allowed, and \$10,000 to commence work on the jetty at the mouth of Nehalem bay. To improve the Upper Willamette above Portland, \$12,000 is appropriated. Ten thousand dollars is allowed for dredging at Tillamook bay.

The men in a Seattle foundry are out on a strike, and the foundry's products have been boycotted because the proprietors were learning the trade, and constituted more than the number of apprentices allowed by Union rules.

Grand Canyon of the Colorado.

NUMBER III.

In continuing the description of the Grand Canyon of the Colorado an engraving is given this week of "The Temples and Towers of the Virgin." In the center of the picture is the Western temple; to the right of it is the Mukuntuweap Fork or Little Zion Valley, and across it is the eastern temple. On the extreme right is the opening of the Parunuweap. In the middle distance is the inner canyon of the Virgin. In Dutton's United States Geological Survey Monograph he says, in speaking of the temples and towers of the Virgin: At our feet the surface drops down by cliff and talus 1200 feet upon a broad and rugged plain, cut by narrow canyons. The slopes, winding ledges and scanty soil display colors which are truly amazing. From right to left across the further foreground stretches the inner canyon of the Virgin, about 700 feet deep and here of considerable width. Across the canyon, a mile and a half beyond, stands the central and commanding object of the picture, the Western temple, rising 4000 feet above the river. Yet it is only the central object of a mighty throng of structures, wrought up in the same exalted style and filling up the entire panorama.

The Parunuweap is seen emerging on the extreme right through a stupendous gateway and chasm on the terrace nearly 3000 feet in depth.

Directly in front of us is a complex group of white towers, which, springing from a central pile, mounts upward to the clouds. Out of their midst and high over all rises a dome-like mass which dominates the entire landscape. The towers which surround it are of inferior mass, but each is a study of fine form and architectural effect.

Nothing can excuse the beauty of the Little Zion valley, which separates the two temples and their respective groups of towers. Nor are these the only anblime structures which look down into its depths, for similar ones are seen on either hand until a turn in its course carries the valley out of sight.

THE STRIKE.—There is no special change in the situation in the matter of the molders' strike in this city. The Foundrymen's Association continues to bring in more men to take the places of the strikers, notwithstanding the patrols intended to prevent this. A number went into one of the foundries this week dressed in tourist's costume, passing by the patrol of strikers without being recognized as molders. It is stated that the men who are out are now willing to arbitrate on some of the points involved, but insist on the former rate of wages. As the strike continues, there is great loss on both sides, considerable work going elsewhere to be done.

The purchasers of the Lucky Dog mine near Unionville, Nev., are erecting works to reduce the ore. The works will be erected in the north fork of Cottonwood canyon, known to old-timers in Unionville as Anderson Creek, just below the mine.

THE MECHANICS' INSTITUTE FAIR will be postponed so that the Native Sons of the Golden West and the California Pioneers can use the Pavilion on the 8th, 9th and 10th of September, in celebrating Admission Day.

The building erected in East Oakland by F. M. Smith for a borax refinery will not be used for that purpose, inasmuch as Mr. Smith has bought the Alameda borax refinery, formerly owned by W. T. Coleman.

THE CALAVERAS Chronicle says three of the dead miners in the Utica mine can be seen, but it will take a good deal of work before their bodies can be recovered. There are still 13 bodies in the mine.

THE balance-sheet of the South Yuba Water & Mining Company of Nevada county for 36 years shows total receipts of \$3,853,481.87, and dividends paid of \$1,239,358.79.

FIFTY TONS of rail of the Burgion patent have been rolled and shipped to A. D. Wilder, who will lay a mile of experimental track on the Oakland mole.

WORK is progressing on the construction of the Oakland electric street railroad. The trackways are being built on Thirteenth street, west of Franklin.

The Bear Valley Arch Dam.

The American Society of Civil Engineers has taken an interest in this remarkable structure in the San Bernardino mountains, and recently asked the company to have experiments made upon it to determine the elasticity of such works. This proposition arose from the fact that a larger dam is to be constructed below the present one, and it was believed that such an occasion should be utilized to make the unique experiments for which there has never been a similar opportunity. Circular letters were sent to all the members of the society, to technical and engineering societies, and to distinguished scientific engineers. In reply to this circular letter, Mr. John G. North, the general manager of the Bear Valley Land and Water Co., has written to Secretary John Bogart that "the company fully appreciates the value to engineering science of the observations and measurements suggested, and will see that they are made. Prof. George Davidson, who has recently acted as consulting engineer for the company, will undoubtedly consent to make the observations with the chief engineer of the company, Mr. Frank E. Brown, who designed and built the present structure."

Mr. North has written to Prof. Davidson and expressed his wish that he would make the necessary observations and experiments; and the professor has agreed to do so. There can be no doubt but when the proper time comes, an exhaustive series of observations will be made. Prof. Davidson says that Mr. Brown's conception of the present dam and his success in building it have placed him in the front rank of original engineers. There is no danger in the structure, which has stood for years, with water at times reaching crest, pressed upon by ice, and through sharp local earthquakes. The more it is studied the more satisfactory the impression it creates.

An Improved Lamp-Burner.

Lonis Zander of 1223 Twenty-first avenue, East Oakland, has just obtained through the MINING AND SCIENTIFIC PRESS Patent Agency a patent on an improved lamp-burner into which the wick is easily inserted. Fig. 1 of the engravings is a view of the burner, a portion of the side being broken away to show the wick-tube and the upper portion of the slide-plate, *b*, being broken away to show the wick. Fig. 2 is a horizontal cross-section of the wick-tube.

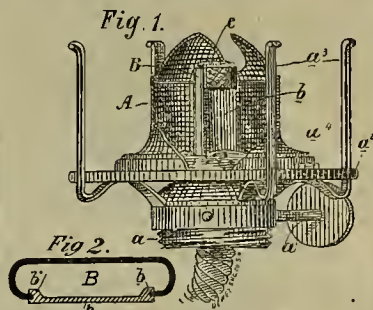
A is an ordinary lamp-burner composed of the usual parts, namely, the threaded shank *a*, the ratchet spindle *a'*, the chimney gallery, *a''*, the spring arm *a'''*, and the hinged cap *a''''*.

B is the wick-tube located as usual. This tube, instead of being a complete hollow casing or shell, is formed with an open side completed by a slide-plate *b*. The main portion of the tube forms one side, the two ends being bent at its edges to form said ends. The movable portion of the slide-plate, *I*, slips in between these bent edges and completes the tube.

The joint between the slide-plate and the main portion of the tube may be of any suitable

character, but the inventor here shows a practical connection consisting of grooved flanges *b'* on the side edges of the slide-plate, which fit over the bent edges of the main portion, thus forming a complete and sufficiently tight joint, which insures the stability of the slide-plate, at the same time permitting its ready removal and insertion.

C is the wick. When the wick is to be in-



Zander's Improved Lamp-Burner.

serted, the slide-plate is removed from the tube *B*, thereby exposing the open side of said tube. The wick is then inserted in the tube through its open side, the edges of the wick being readily pressed in past and under the bent edges of said tube. Then the slide-plate is put back, thus fully inclosing and confining the wick. This operation is easier than the usual process of forcing the wick through a complete tube and past its ratchet wheels.

The reduction works at Redding, Shasta county, which were about to be started up again, were destroyed by fire on Wednesday. The loss is about \$6000.



Fig. 6.—GLACIAL BANK AT BLUE TENT MINE, NEVADA COUNTY, CAL.

An Electric Rotary Pump.

Emory I. Nichols of this city has procured through the MINING AND SCIENTIFIC PRESS Patent Agency, a patent (No. 425,106) on a simple electrically driven pump, the inventor wrapping the revoluble shell of a rotary pump with wire in such a manner as to form an armature of an electric motor.

There is a fixed hollow shaft, one end of which forms the inlet port and the other the outlet. This shaft is formed with an eccentric center having an encircling port communicating with the inlet and discharge ports. Upon the shaft is mounted, and adapted to revolve, a shell, which, inclosing the eccentric center, forms at one part or line, an abutment, and at the remaining portion a water-space. Suitable packing and stuffing boxes are used between the parts.

In the shell are swinging pistons controlled by springs and operating against the circumference of the eccentric center. This forms a rotary pump, the operation of which, upon revolving the shell, is obvious. To revolve this shell, Mr. Nichols makes the pump, or a rim connected therewith, from the core of an electric motor. This is done by properly wrapping the shell with wire so as to form an electric armature. This wrapping may be done in any suitable manner, and it may be directly on the shell or upon a rim carried by the shell.

The operation of the device is as follows: The electric current, passing through the brushes and energizing the armature, the latter is revolved by the field magnets. The shell is therefore rotated, and, through its pistons, sucks in and forces out the water. An advantage of this form of armature lies in the fact that by reason of the hollow journals through which the water is passing there is no liability to the drawback of hot journals to which high-speed electric motors are subject. Mr. Nichols has assigned this patent to Irvine Stewart and Frank F. Tremper of this city.

The Deep Gold Placers of California.

(Concluded from page 264.)

lying by their sides, are concave on the inner surface, leaving the remaining portion more or less globular, as in the case of the granite boulders before mentioned. The basalt is uniform in structure, has no particular cleavage, and breaks with a tendency to form sharp angular fragments; yet the same rock, when exposed to the action of the elements for a long period, invariably weathers into rounded forms while lying on the surface of the ground, and not subjected to any special action of water above that of small winter streams and overflows. This discovery led to more careful examinations, and I am convinced that this is a general law which bears equally on all rocks, including the quartz, which, being harder, resists longer, but eventually yields to the inevitable law, and its fragments become rounded, far from rivers or rushing waters. When by accidental floods or changes in the course of streams, boulders fall into their beds, they become more rounded and smoothed. At Red Hill I actually saw quartz boulders being thus formed, which, without doubt, came from a prominent quartz vein within a few hundred feet of where they lay. Closely observing boulders of every variety of rock which lie exposed in the placer and hydraulic mines, I found them all showing evidences of this law, and I collected concave scales which have been placed in the State Museum, where they will be preserved and may be studied by those who take an interest in this most interesting subject.

I have in my collection a small howlder of diabase from near Boston, Massachusetts, which shows this weathering in a striking manner.

No soft rock can become a howlder, or if so its life as such must be very short, for if not ground to silt by the forces referred to, it would quickly disintegrate if exposed to the atmosphere and the rays of the sun. For this reason I assume that the soft bedrocks of the ariferous channels so deeply excavated were disintegrated and washed away by the glacial rivers, while the more resistant quartz and the malleable gold sank to the bedrock and have so remained.

The fact that howlders are generally elongated, lenticular and egg-shaped instead of being more perfectly spherical, has much puzzled geologists. Von Cotta ("Rock Classification and Description," English Edition, London, 1866) thus refers to this peculiarity:

"This very universal law is evidently the result of an unequal degree of resistance to waste, presented by the stone in the direction of one or more normal axes. In the case of rocks of slaty texture or the like, this phenomenon may be readily conceived; but in the case of compact and granular rocks without a trace of fissile or laminated texture, it is more remarkable, and points to some parallelism of texture or structure which has hitherto escaped observation."

My study of this subject leads me to the conclusion that this form is due to the accidental shape of the original fragments, the rounded howlder retaining in some degree its cuneiform, tabular or intermediate character.

Boulders are found in the beds of modern rivers certainly, but it does not follow for that reason that they are wholly the result of the action of water flowing in a channel, for they lie scattered over the whole country and in the glacial drift they are placed as described elsewhere. If any stream flowing in such a formation could be diverted and forced to cut a new channel, boulders would be as numerous as in the old.



Fig. 5.—STRATIFIED GLACIAL DEPOSIT NEAR HAMILTON, OHIO.

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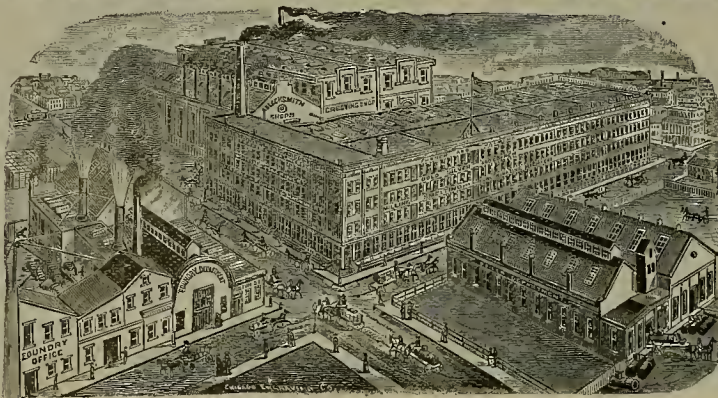
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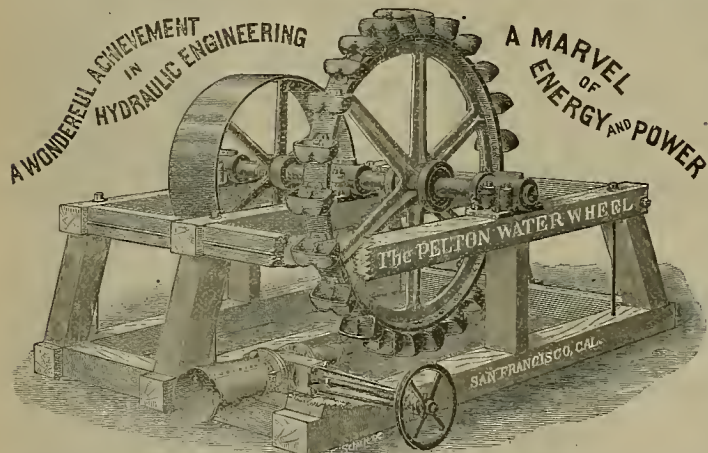
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APPLICATIONS

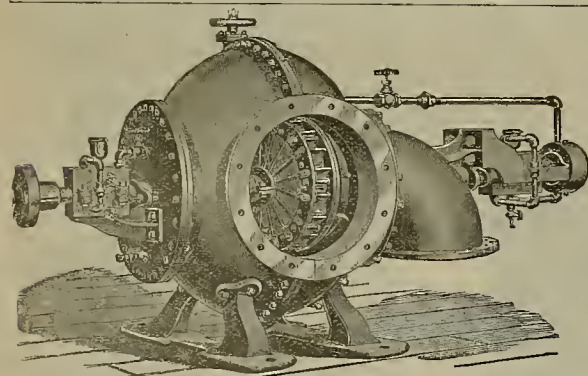
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Should consult DEWEY & CO. AMERICAN AND FOREIGN PATENT SOLICITORS, for obtaining Patents and Caveats. Established in 1860. Their long experience as journalists and large practice as Patent attorneys enables them to offer Pacific Coast Inventors far better service than they can obtain elsewhere. Good for free circulars of information. OFFICE OF THE MINING AND SCIENTIFIC PRESS AND PACIFIC RURAL PRESS No. 240 Market St., San Francisco. Elevator, 12 Front St.

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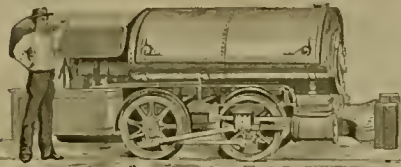
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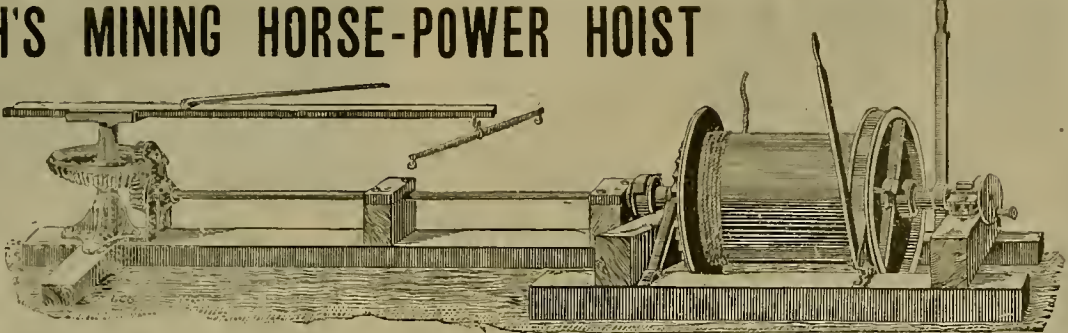
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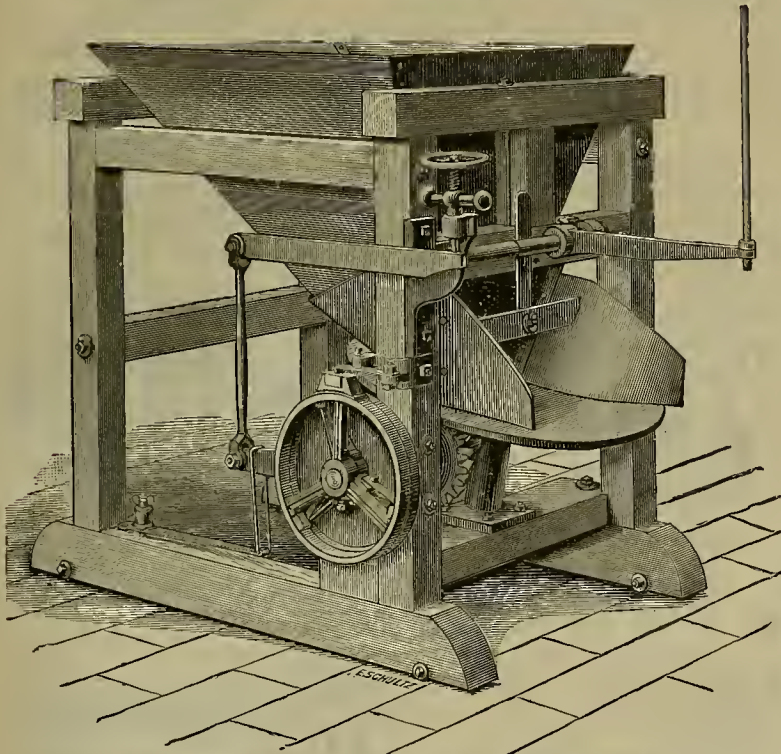
Is known to be the best Horse-Power Hoist now made. It is strong and durable.

The drum will carry 1000 feet of five-eighths steel rope. It can be used to run a pump or blower, in conjunction with hoisting.

Manufactured by F. W. Krogh & Co., 51 BEALE ST., San Francisco.

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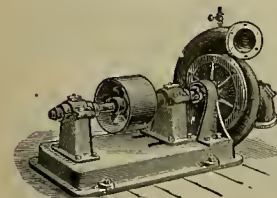
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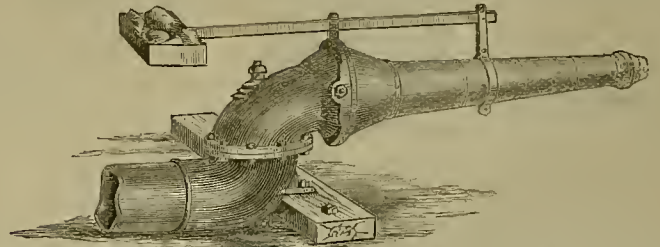
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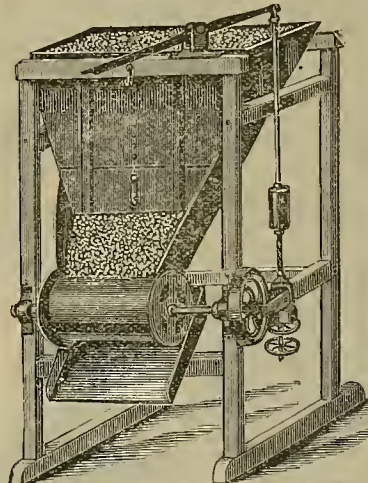
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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, April 17, 1890.

Continued clear weather and improved inland transportation facilities bring in more trade. The volume of goods going out on orders is large, larger than at this time in 1889.

The iron-molders' strike is still on. Founders appear more cheerful and express confidence in their ultimate success. This opinion is grounded on their securing more molders as each week rolls around.

The money market shows continued ease. Remittances from the interior are fairly free, while the call for accommodations is not very marked. Wools are moving freely, consequently the demand for funds on warehouse receipts from that source is not as large as it was at this time in 1889. The moving of the clip gives exchange on New York, which is very opportune considering that very few of our other products are being shipped to the East owing to being out of season.

MEXICAN DOLLARS.—The demand continues light. The market has advanced in sympathy with an advance in silver. The market closed today at 78c@78½c. The last steamer for China took out \$74.98.

SILVER.—The Congressional Committee, having the silver hills in charge, have virtually agreed upon the Senate bill. This is equivalent to passing both branches of Congress; no doubt to this is due the strength of silver in the markets of the world, and which now promises, with the passage of the bill and its approval by the President, still higher prices, with, eventually, its gradually working up to par. The advance in silver abroad and sterling bills going up, are bringing exporters into the market who naturally look forward to an improved demand later on for exchange purposes.

The local market has advanced until 99 cents is paid by the Mint. An exporter quoted us this morning over \$1 as his price to-day, yet he stated the market was feverish and excited abroad, which might make the price fluctuate. To-day's telegrams quote the London market at 46½d, and the New York market at \$1.75.

QUICKSILVER.—Receipts the past week aggregate 94 flasks. The overland shipments in last month aggregate 27,000 lbs. The home demand continues free, said to be larger than for several years past. The market is reported firm at unchanged quotations. There was shipped by sea the past week 200 flasks in transit to Mexico.

BORAX.—The overland shipments last month aggregate 1062 cts. The market continues firm at full quotations. The East reports a steady market. Last week there was shipped by sea 1994 lbs. to Mexico.

LIME.—Receipts the past week aggregate \$295 bbls., and exports by sea 250 bbls. to Kahului. The market shows continued activity under a large increasing home consumption.

LEAD.—The exports by sea the past week aggregated 90,653 lbs. to New York. Receipts here show a slight increase. The consumption is reported to be larger. At the East the market has receded under a lighter demand and fair receipts.

TIN.—Imports the past week aggregate 2268 ingots from Australia, and the exports 4061 lbs. to Victoria. Cannerymen are busy. It now looks as if more cans will be made this year than there were in 1889. Both salmon and fruit canners look for a more active season. In roofing and other tin it is claimed that the consumption is enlarging. London cable advices report the stock at shipping points 538,000 boxes against 351,000 boxes at the corresponding time last year.

IRON.—In the local market there are no new features to note. The founders are gradually increasing the number of molders at work, and as a result more iron is going into consumption. While there is an easier tone to the market, yet quotations remain unchanged. Eastern advices are confirmatory of large quantities being delivered; the low prices, about the same that were current the forepart of last summer, induce buying. Bessemer pig sold as low as \$17.65, but closed at \$18 cash bid. Southern furnace-men continue their close competition in the northern markets, underselling the home furnace-men.

COPPER.—The markets, the world over, are reported strong, with stocks being steadily reduced. The enlarged demand for copper is due to the increasing uses it is being converted to. This naturally encourages mine-owners, who see in the future not only a stable but a strong market. The consumption in this country has increased to such an extent that the export shipments from the Atlantic seaports are greatly reduced.

COAL.—Imports the past week aggregate as follows: Newcastle, N. S. W., 2213 tons; Tacoma, 5200; Seattle, 4561; Nanaimo, 2300; Departure Bay, 3500; Coas Bay, 400; overland, 20; total, 13,194 tons. The market for steam and gas coals is very strong, with light stocks here and to arrive. Coast coals are steady. The output of the collieries is so regulated as not to produce too much of a surplus. The railroads are using quite largely coal coals, which aids materially in keeping the market well in hand.

Eastern Metal Markets.

By Telegraph

NEW YORK, April 17, 1890.—The following are the closing prices the past week:

	Silver in London	Silver in New York	Copper	Lead	Tin
Thursday	44½	98½	\$14 25	\$1 7½	\$19 85
Friday	44½	98½	14 25	1 7½	19 85
Saturday	44½	98½	14 25	1 7½	19 85
Sunday	44½	98½	14 25	1 7½	19 85
Tuesday	44½	98½	14 25	1 7½	19 85
Wednesday	44½	98½	14 25	1 7½	19 85

NEW YORK, April 15.—Quicksilver and borax are unchanged. The metal markets were generally dull, copper being the only item showing firmness; Lake, held 14½@14¾c, refused carting 12½@13¾c. Pig lead, about 300 tons, \$3.85.

The manager reports that 495,000 people have visited "California on Wheels" up to April 9th.

MINING SHAREHOLDERS' DIRECTORY.

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COMPANY.	LOCATION.	NO. AM'T. LEVIED.	DALING'T.	SALA.	SECRETARY.	PLACE OF BUSINESS.
Alabama M Co.	Nevada.	1.	8. Mar 13.	Apr 22.	May 13.	W H Watson. 302 Montgomery St.
Alpha Cons M Co.	Nevada.	4.	25. Apr 5.	May 16.	June 5.	C S Elliott. 309 Montgomery St.
Andes S M Co.	Nevada.	36.	25. Apr 10.	May 14.	June 3.	J J Hawkins. 309 Montgomery St.
Bailey M Co.	Nevada.	1.	8. Mar 13.	Apr 22.	May 13.	W H Watson. 302 Montgomery St.
Confidence S M Co.	Nevada.	15.	75. Mar 12.	Apr 16.	May 7.	A S Groch. 414 California St.
East Best & Belcher M Co.	Nevada.	11.	25. Feb 11.	Mar 14.	Apr 31.	C H Mason. 331 Montgomery St.
Harbuck M Co.	Nevada.	1.	18. Apr 24.	Apr 30.	Apr 23.	W E Bates. 226 Montgomery St.
Hartford M Co.	Nevada.	35.	50. Apr 9.	May 14.	June 5.	A B Thompson. 309 Montgomery St.
Humboldt M Co.	Nevada.	11.	25. Mar 16.	Apr 17.	May 8.	C E Elliott. 309 Montgomery St.
Ind. Creek M Co.	California.	21.	10. Mar 12.	Apr 14.	May 14.	S O Mills. 419 California St.
Martin White M Co.	Nevada.	23.	25. Feb 12.	Mar 31.	Apr 30.	A B Cooper. 325 Montgomery St.
Mayflower Gravel M Co.	California.	46.	50. Mar 8.	Apr 10.	May 1.	J Morizio. 328 Montgomery St.
Navajo M Co.	Nevada.	20.	50. Apr 8.	May 15.	June 6.	J W Pew. 310 Pine St.
North Belle Isle M Co.	Nevada.	17.	20. Apr 8.	May 14.	June 5.	J W Pew. 310 Pine St.
North Occidental M Co.	Nevada.	2.	6. Mar 31.	May 5.	May 28.	W H Watson. 302 Montgomery St.
Ophir M Co.	Nevada.	11.	25. Mar 12.	Apr 17.	May 8.	C S Elliott. 309 Montgomery St.
Peerless M Co.	Arizona.	5.	10. Mar 23.	Apr 30.	June 9.	A Waterman. 308 Montgomery St.
Potosi M Co.	Nevada.	34.	50. Mar 27.	Apr 30.	May 21.	C E Elliott. 309 Montgomery St.
Quaker C M Co.	California.	18.	20. Mar 18.	Apr 6.	May 6.	A Cheminant. 325 Montgomery St.
Silver Hill M Co.	California.	1.	10. Mar 12.	Apr 14.	May 20.	H C Bates. 309 Montgomery St.
Standard Cons M Co.	California.	2.	25. Mar 4.	Apr 14.	May 19.	J W Pew. 314 Pine St.
Union Cons M Co.	Nevada.	40.	25. Mar 5.	Apr 10.	Apr 30.	J M Buffington. 303 California St.
Utah Cons M Co.	Nevada.	9.	25. Mar 11.	Apr 17.	May 5.	A H Fish. 369 Montgomery St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Baltimore S M Co.	Nevada.	A K Crim	402 Montgomery St.	Annual.	Apr 18
California Iron & Steel Co.	California.	F Bonadina	433 California St.	Annual.	Apr 21
Candelaria Cons M Co.	Nevada.	A S Cheminant	309 Montgomery St.	Annual.	Apr 25
Con California & Va M Co.	Nevada.	A W Havens	309 Montgomery St.	Annual.	May 3
Derbec Blue Gravel M Co.	California.	T Wetzel	522 Montgomery St.	Special.	May 1
Ind. Creek M Co.	California.	J M Buffington	325 Montgomery St.	Annual.	Apr 21
Russell Reduction & M Co.	California.	J Morizio	325 Montgomery St.	Annual.	Apr 30
Teresa M Co.	California.	A Cheminant	325 Montgomery St.	Annual.	Apr 30

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Champion M Co.	California.	J Wetzel	522 Montgomery St.	10	Jan 20
Candelaria Cons M Co.	Nevada.	A S Cheminant	309 Montgomery St.	25	Apr 5
Caledonia M Co.	Nevada.	A S Cheminant	328 Montgomery St.	25	Apr 1
Con California & Va M Co.	Nevada.	A W Havens	309 Montgomery St.	25	Feb 10
Derbec Blue Gravel M Co.	California.	T Wetzel	522 Montgomery St.	10	Dec 23
Ind. Creek M Co.	California.	J M Buffington	325 Montgomery St.	20	Mar 7
St. Diablo M Co.	California.	J B Head	319 Pine St.	20	Oct 21
Pacific Borax Salt & Soda Co.	California.	A H Clough	230 Montgomery St.	1 00	Feb 10

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Mar. 27.	WEEK ENDING Apr. 3.	WEEK ENDING Apr. 10.	WEEK ENDING Apr. 17.
Alpha.	85	110	100	145
Alma.	110	151	151	145
Andes.	40	50	50	70
Belcher.	140	180	205	215
Best & Belcher.	250	280	300	325
Bullion.	60	100	110	150
Butte Cons.	45	50	50	70
Buena Vista.	20	25	25	30
Commonwealth.	250	280	300	325
Con. Va. & Cal.	415	445	445	562
Challenge.	115	140	160	180
Chollar.	210	230	250	280
Confidence.	275	300	325	350
Con. Imperial.	35	40	40	55
Caledonia.	20	25	25	30
Crown Point.	150	180	205	215
Crocker.	25	30	30	35
East.	30	35	35	40
Eureka Cons.	30	35	35	40
Excelsior.	45	50	50	65
Grand Prize.	60	65	65	80
Gould & Curry.	125	150	150	180
Hale & Nor.	200	230	250	280
Julia.	35	40	40	55
Justice.	130	135	170	180
Kentuck.	75	80	100	125
Lady Wash.	30	35	35	40
Mexican.	285	320	325	350
Navajo.	25	30	30	35
North Belle Isle.	120	130	110	100
Nev. Queen.	65	75	65	60
Occidental.	80	85	100	115
Ophir.	870	410	415	400
Overman.	35	105	110	145
Potosi.	200	380	440	500
Pearl.	10	20	20	25
Peerless.	30	35	35	40
Sage.	150	180	180	200
S. B. & M.	100	150	135	150
Sierra Nevada.	200	240	230	250
St. Hill.	30	35	35	40
Union Cons.	210	230	230	250
Utah.	45	55	55	60
Yellow Jacket.	190	205	220	230

Sales at San Francisco Stock Exchange.

THURSDAY, Apr. 17, 9:30 A. M.	200 Julia.	300
200 Alta.	250 Justice.	135
100 Andes.	100 Mexican.	360
300 Alpha.	150 Nevada.	250
150 Belcher.	500 N. Commonwealth.	115
150 B. & Belcher.	100 Occident.	145
150 Bullion.	500 Potosi.	435
150 Challenge.	1000 Potosi.	150
400 Chollar.	300 Sage.	205
100 Crown Point.	600 Scorpion.	250
150 Con. Imperial.	200 S. B. & M.	140
240 Con. Cal. & Va.	400 Sierra Nevada.	70
150 Excelsior.	100 Silver King.	70
130 G. & C.	700 Utah.	110
415 Hale & Nor.	760 Union.	295
50 Holmes.	430 Yellow Jacket.	270

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E. H. SCHARFLE—Amador and Tuolumne Cos.
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Wm. H. HOLBROOK—Oregon.
E. E. DRUMING—Oregon.
CHAS. M. MOODY—Oregon.
R. G. HUSTON—Montana.
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Assessment Notices.

ACOME M. L. AND MINING COMPANY: Location of principal place of business, San Francisco, California. Location of Works, Amador County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 20th day of March, 1890, an assessment, No. 10, of 3 cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 11, No. 303 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of May, 1890, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, THE 9th DAY OF JUNE, 1890, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
J. M. BUFFINGTON, Secretary.
Office, Room 11, No. 303 California Street, San Francisco, California.

GOLD HILL MINING COMPANY: Location of principal place of business, San Francisco, California; location of works, Grass Valley, Nevada County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 17th day of April, 1890, an assessment (No. 9) of Twenty-five Cents per share was levied upon the Capital Stock of the Corporation, payable immediately, in United States Gold Coin, to the Secretary, at the office of the Company, Room 20, Phelan Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 24th day of May, 1890, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 10th day of June, 1890, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.
C. A. GROW, Secretary.
Office, Room 20, Phelan Building, San Francisco, California.

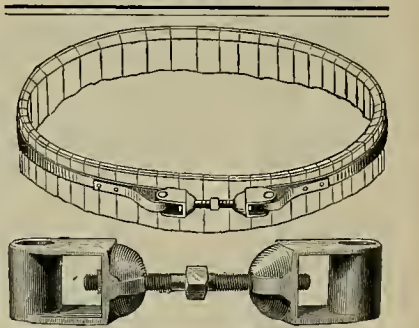
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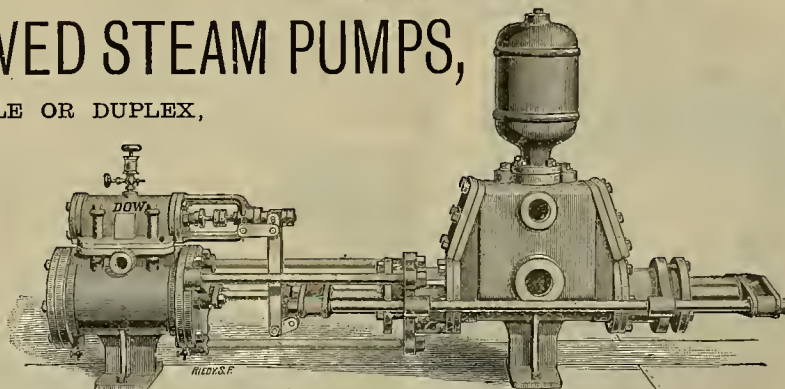
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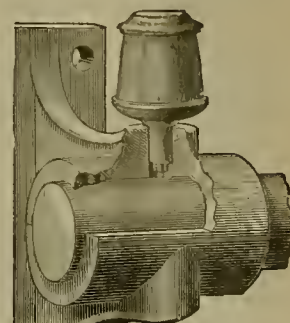
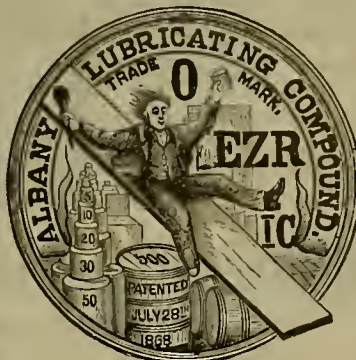
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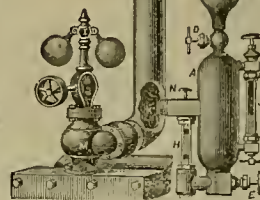
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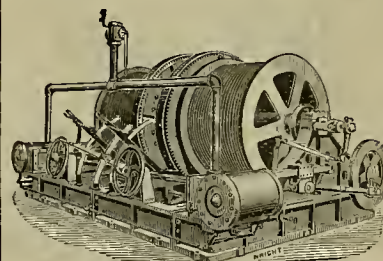
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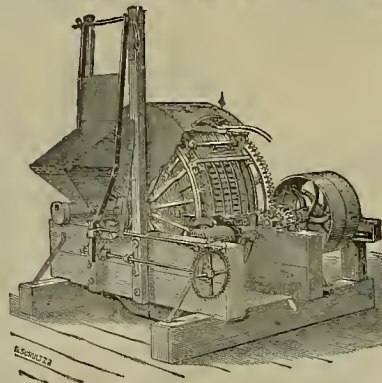
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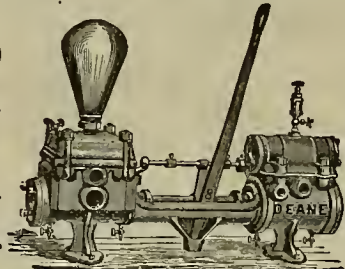
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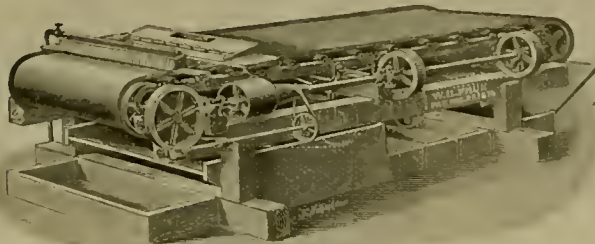
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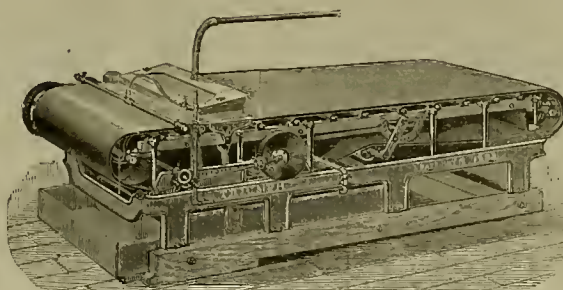
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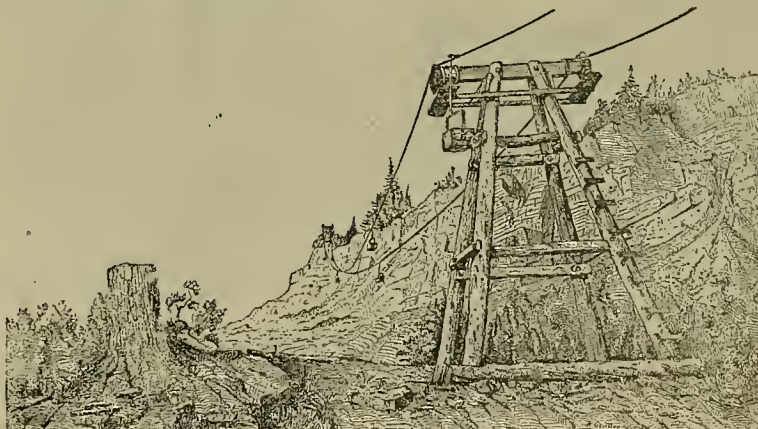
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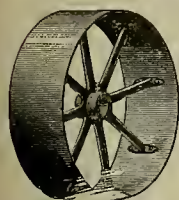
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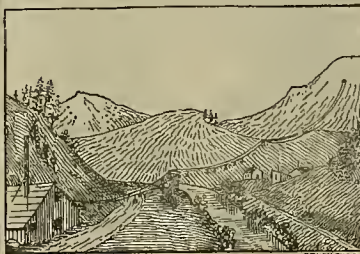
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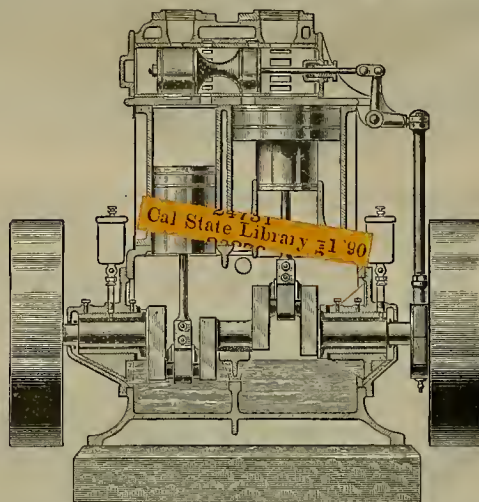
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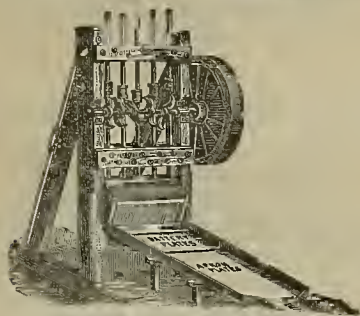
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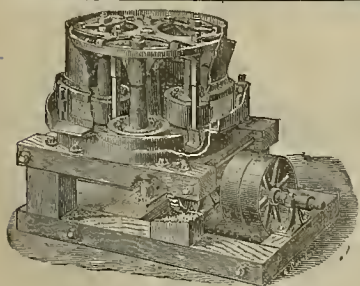
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N. B.—CHAPPELLE, Butte Co., Cal., Nov. 10, 1889.—Mr. Jas. Day, Chico: The little mill is a daisy; it comes up to all expectations; it works perfect in all respects. Yours truly,
WALKER, REESE & Co.



MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

VOL. LX.—Number 17.
DEWEY & CO., PUBLISHERS.

SAN FRANCISCO, SATURDAY, APRIL 26, 1890.

Three Dollars per Annum
Single Copies, 10 Cts.

The Thompson Engine.

An Independent Cut-Off Engine of California Design.

On this page to-day we publish a cut of the I. F. Thompson automatic independent cut-off slide-valve engine. For many years engineers have felt the want of a more simple and less complicated form of independent cut-off engine than has heretofore been in use. For instance, an engine that will give the same or better results by a more simple and direct method of operating than the Corliss. The Thompson engine supplies that want, and it combines great simplicity of construction with close economy in the use of steam. The sole-plate or frame of the engine is a combination of the box-form and the Corliss. The cylinder is attached to the frame with a heavy strong hood, and has in its center a substantial foot that bolts to the foundation. Said cylinder and also the steam chest are nicely lagged with black walnut.

Between the lagging and cast iron there are two inches of asbestos and felting, to prevent radiation of heat.

The heat of steel and phosphor-bronze enters largely into the construction of the working parts. The entire engine is well finished throughout, being built heavy and strong.

There are four plain, simple slide-valves, two steam and two exhaust, all working and capable of being set entirely independent of each other. They lie flat upon their seats with their faces down. The exhaust valves are operated by a plain straight-line connection, and when they are once properly set, remain constant, and do not alter their relative positions to each other. The steam-valves work entirely independent of the exhaust valves, and also of each other; they are operated by an arm that is attached to the main valve-rod. There is a piece of hardened tool-steel bolted to the inside end of said arm, that engages with a corresponding piece of steel that is attached to a hinged trigger, which moves with and is part of the valve-stem which operates this particular valve. On the outward end of said valve-stem there is a dash-pot or air-cush-



AT THE MOUTH OF THE TUNNEL OF THE HOGSBACK DRIFT MINE.—See page 286.

ion of peculiar construction, having piston and snap-ring to keep it tight. On the opposite end of the same stem is a small solid steam-piston, that extends through its stuffing-box into the steam-chamber, and is there attached by means

of a large brass nut to the main steam-valve, thereby making the line complete and solid from the air-cushion on the outside to the steam-valve on the inside of the steam-chest.

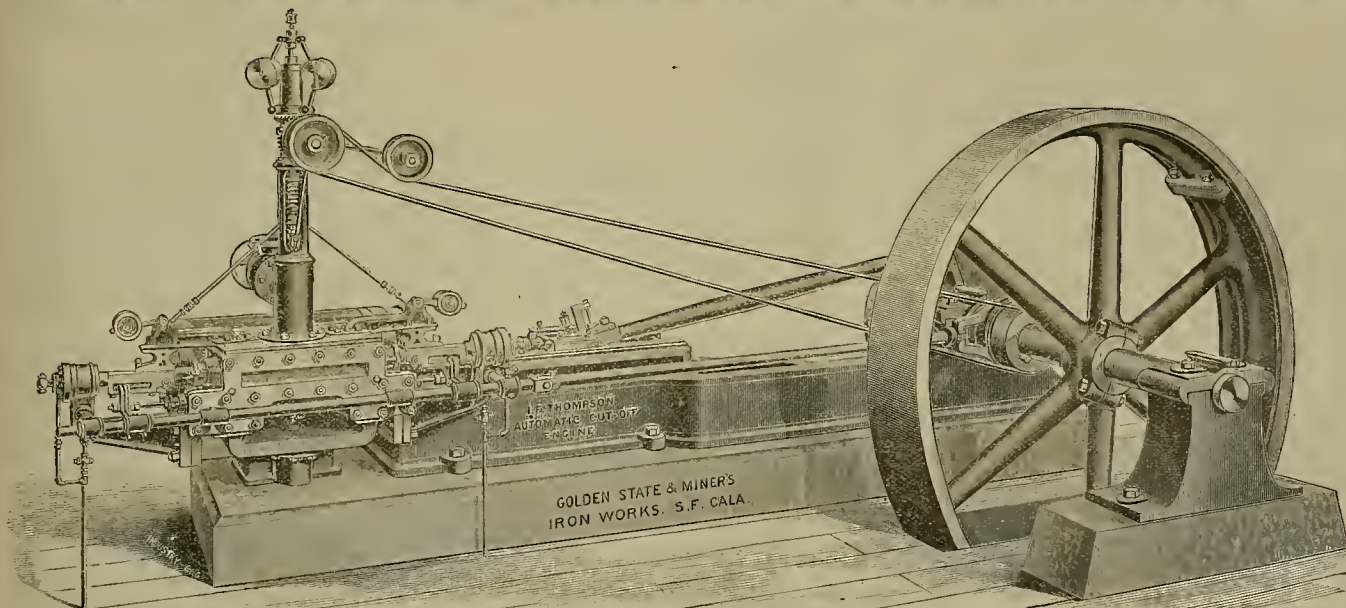
Then, when the main valve rod is carried

forward by the action of the eccentric, the steels on the above described arm and trigger engage with each other, and carry forward the attached steam valve to any point that may be required to cut off at the moment.

Then the two steels that are attached to the arm and trigger are released from each other by the action of the governor. At that moment the steam in the steam chest, acting on the small piston to which the valve is attached, throws it outward, until its motion is arrested by the air cushion on the opposite end of stem, thereby accomplishing an instantaneous cut-off.

Attached to the top of the trigger are two small tappets, which, when the stem is carried forward, travel up an incline plane or wedge, gradually raising the trigger until it is released from the moving arm. Said wedge is attached by means of a bell-crank and rod to the governor, and advances or recedes as the governor-hells raise or lower, thus

(Continued on page 287.)



THE THOMPSON AUTOMATIC INDEPENDENT CUT-OFF SLIDE-VALVE ENGINE.

The Deep Gold Placers of California.

NUMBER IV.

[Written for the Press and Copyrighted 1890, by HENRY G. HANES, F. G. S. A., F. G. S.]

Channel Filling—Gravel, Sands, Silts and Slickens.

It has been shown that a large proportion of the channel filling is finely divided. The following mechanical analyses, including one from Ohio, show the general character of these sediments. Of course large boulders could not be included. A calculation of the percentage of boulders could only be made in a rough way while piping was in progress in some hydraulic mine. I am not aware that such an estimation has ever been made. A large proportion of the boulders weigh many tons each and the miners are compelled to blast or remove them with large derricks operated by water-power.

Mechanical Analyses.

- A—Dutch hydraulic mine, near Laporte, Plumas county.
- B—Edman mine, Plumas county, California.
- C—Concentrates, Cherokee Flat, Spring Valley hydraulic mine, Butte county, California.
- D—Gravel, Nevada hydraulic mine, Chalk Bluffs, Nevada county, California.
- E—Ohio Glacial Drift, from Butler county, sent by D. A. McCord of Oxford, Ohio.
- F—Polar Star mine, Dutch Flat, Placer county, California.

Total	100	100	100	100	100	100
Loss	1.51	1.15			4.21	
Water		13.30				
Passed 100-mesh sieve	6.40			11.77	50.60	
Remained on 100-mesh sieve	2.02		1.783	1.37	1.13	.03
Remained on 80-mesh sieve	1.19		1.46	1.63	0.72	3.76
Remained on 60-mesh sieve	6.95	3.00	40.54	3.30	3.25	3.42
Remained on 40-mesh sieve	8.17	3.00	33.03	3.13	2.83	3.73
Remained on 20-mesh sieve	11.25	4.38	0.687	1.03	1.88	8.01
Remained on 10-mesh sieve	23.10	4.45		7.07	8.41	23.14
Remained on 5-mesh sieve	16.34	9.33		2.37	11.21	41.65
Remained on 3-mesh sieve	22.87	23.70		39.80	29.89	41.65
	A	B	C	D	E	F

- A 1—Pebbles from 1/2 inch to 1 inch in diameter, 3 per cent were quartz, 40 per cent were rounded and 60 per cent angular and sub-angular.
- A 2—80 per cent quartz, 20 per cent rounded, 16 per cent sub-angular, 64 per cent angular.
- A 3 to A 5—Nearly all quartz, all angular.
- A 6 to A 9—All quartz, all angular.
- B—All portions contained gold.
- C—Contained magnetic sand with zircon, platinum and gold.
- A second portion treated in Schultze's apparatus gave the following results:

	Per cent.
N—First light portion	23.93
O—Second light portion	40.99
P—Coarse, heavy portion	7.14
Q—Remained in apparatus	27.56
R—Amalgam—gold 0.10, mercury 0.23	0.33
Total	100.00

Portion "N" was quartz in angular fragments, black sand in obscure crystals or rounded forms, small masses of globular pyrites in minute crystals, with crystals of pyrite attached. But few of the black granules were magnetic. "O" much the same, but with more black grains, some of which seem to be obsidian, a few doubly terminated quartz crystals and clusters of pyrite crystals. "P" nearly the same in appearance but larger grains; all angles of pyrite un worn. "Q" This was the most interesting portion, consisting largely of perfect crystals of zircon and black grains, a few green and red in the following proportion, picked out by hand: Black grains, 62; red grains, 1; zircon, 37. The black grains were heated to redness, upon which a few became magnetic. When ground in an agate mortar, a brown powder was formed, which resisted the action of acids. In a head of borax before the blowpipe, a strong chromium reaction was obtained. "R" was gold amalgam left in the sample, but which could easily have been removed by simple concentration. The gold was equal to 2.133 pounds avoirdupois to the ton of 2000 pounds, having a value of \$643.01 to the ton. D. This sample was taken from a pillar near the surface, and is considered a fair sample of the gravel worked in the mine for 15 years. A proper reduction for the large boulders which are plentiful in the mine, if it could be

calculated, would reduce the percentages of all the parts obtained in this analysis. After separation of the larger pebbles and the coarser gravel, the finer portion was carefully washed; no gold was found, but a very heavy grayish sand remained on the batea. This was examined microscopically and found to be composed of some black non-magnetic particles, a white mineral resembling quartz, a few red crystals, and others resembling rough diamonds; a small portion of magnetic sand, and an abundance of beautiful crystal of zircon. The red crystals were obscure, being somewhat worn on the edges. Those thought to be diamonds had that peculiar steatite luster and appearance common to rough diamonds, and were extremely brilliant to reflected light. A whitish substance floated on the water in which the dirt was washed; this, under the microscope, was found to be pine sawdust, and being foreign, was not weighed or estimated. D 1 was large pebbles, 89 per cent of which were quartz; they were all rounded as if water-worn. D 2 was coarse gravel, between half an inch and one inch in diameter. It contained 63 per cent of quartz; nearly all the gravel was rounded. D 3 contained 57 per cent of quartz. The other portions consisted largely of quartz; nearly all the grains were angular and not in the slightest degree worn. D 9 was fine slickens, which, being allowed to dry in a mass, became hard and broke with a fine-grained conchoidal fracture like lithomarge. Examined microscopically, it had the general appearance of the others. There should be a distinction made between "mining debris" and "slickens." The former consists of boulders and heavy particles which remain near the mines; the latter is finely divided silt, so light that it floats to a long distance, and only settles in stagnant water or in streams that move very slowly. E 2, fragments from 5 to 20 mm., all somewhat rounded, none of them quartz, 62 per cent limestone, not by weight but by counting particles. E 3 fragments nearly all angular, a few white quartz which are rounded. The angular fragments seem to be limestone. There were several fossil bivalve shells and a few granules of sandy quartz had numerous metallic particles imbedded; 67 per cent effervesced with hydrochloric acid. E 4 all angular; fragments of fossil corals, limestone and quartzite and fine-grained crystalline rocks; but little quartz, and this angular. E 5 same general character as E 4 but smaller grains; schists, sedimentary rocks, and fossil corals; one of the chalcedonic spheres seen so abundantly in E 9 was observed. E 6 nearly all angular; largely quartz most of which is crushed and shows conchoidal fracture, a few worn ones, some of the red mineral seen in E 9. E 7 nearly all quartz, most of which is angular, many sperminolite-like globules (chalcedony?). E 8 does not differ materially from E 7 except in size of particles. E 9 was very finely divided quartz fragments in a nearly amorphous powder; no organic forms could be discovered except limestone in small quantity shown by effervescence in acids. Concentrates from E 9, one gram; consists largely of nearly transparent quartz all in angular fragments, some black and shining particles, others oolite-like, others red-garnet like, broken fragments such as are found in California hydraulic sands, many globular like drops of water but chalcedonic in character; do not seem to be rolled; they are rough on the outside some, transparent or waxy, generally about the same size, none broken; there are no crystals and no metallic particles. F—A sample of 50 pounds taken from near the surface which had never been disturbed by the hand of man. The gravel was colored ocher yellow by oxide of iron, a great portion of which washed off with water. The large pebbles were, with one exception, quartz, with peculiar striations not due to mere water-washing, but deeply grooved as if held in a natural vise while another body moved against them, which seems to be a clear indication of glacial action; the exceptional pebble was serpentine. No noteworthy feature was observed in the microscopic examination of the fine gravels and sand, except the sharp and unworn angles and edges. An examination of the portion left on the batea was unusually interesting. There were some dark-colored and very heavy particles which proved to be battered hard-shot; a few colors of gold were seen, with a considerable quantity of black particles, constituting about 50 per cent of the whole, but few of which were magnetic. There were also a few particles of byssaline quartz and much sharp-angled quartz sand, but no zircon. As compared with dune sand, it was much less worn, the particles being nearly all angular and sharp; the black particles were less angular than those of the quartz. The gold was somewhat coated, the coating being white like silica, but not to the extent common to much of the gold in the placers of the State. Portion F 7 as seen under the microscope was composed of particles made up of exceedingly fine atoms, all of which were quartz, sharp and angular, and colored yellow by oxide of iron. Boiled in nitro-muriatic acid and well washed, the quartz became pure white and the acid solution gave a strong reaction for iron. It

is easy to understand how such a deposit could form beds of yellow ocher when concentrated from sand and gravel by long-continued action of water in motion. The following is the result of examination of samples of sands, silts and slickens, collected from various parts of the State, selected from several hundred in my cabinet. All were gathered by myself at the localities named: AA—Stratified sand, Indiana hill, Gold Run, 60 feet above bedrock, rather a coarse sand; nearly all passes through a 20-mesh sieve; shows no special characteristics. BB—Medium sand used for building purposes, American river, at Twelfth-street bridge, Sacramento. Nearly all passes a 40-mesh sieve. It contained a few magnetic particles, considerable flake mica, mostly angular quartz with some rounded grains. CC—River silt, American river, Sacramento. Used to fill lands to grade. Composed principally of angular quartz; contained a large quantity of mica and woody fiber. DD—Silt from Alviso, Santa Clara county. Blackens after heating to redness; after long-continued ignition becomes red; mostly rounded quartz granules resembling dune sands of San Francisco, but contains considerable mica in scales. EE—Sand from Alameda, Alameda county. Resembles San Francisco dune sand, all the particles rounded and water or wind-worn; nearly all quartz. FF—Fine sand from bank of river opposite Marysville, Yuba county. Sharp, angular fine particles, containing a few scattered scales of mica. GG—Sand overlying (JJ) American river, Sacramento. Coarse, mostly angular quartz, some well-rounded grains and a few flakes of mica. HH—Sand North Bloomfield hydraulic mine, Nevada county. Quartz sand coated with a yellow, finely divided ferruginous slickens, not plastic but easily washed away, leaving sharp angular quartz sand, and revealing the presence of considerable sandy magnetite. This material resembles the auriferous matter found in the Edman mine, Plumas county. II—Samples of auriferous quartz, crushed by myself and passed through a 50-mesh sieve. Identical in appearance with hydraulic sands. JJ—Slickens, American river, Sacramento. Very finely divided, all particles angular, including some flakes of mica. Color, buff; blackens when heated to redness, partly regains color on cooling; this experiment was several times repeated. KK—Slickens, American river, Twelfth-street bridge, Sacramento. Very fine, yellowish colored, the particles were partly cubical; edges somewhat rounded; different from JJ, which is from nearly the same locality; evidently river mud. LL—Slickens, North Bloomfield hydraulic mine, Nevada county, taken from the bedrock; somewhat plastic; when treated with water, softens; a yellowish, very fine silt floats, leaving a coarse, nearly pure quartz sand; perfectly angular. MM—Slickens, North Bloomfield, Nevada county, yellowish colored; with water not at all plastic, a golden-yellow fine powder washed away as in HH, leaving coarse and fine angular quartz sand; no magnetite. NN—Slickens from a lake in Steep Hollow, near Chalk Bluffs, Nevada county, not plastic; colored yellow by oxide of iron; principally quartz sand; granules all sharp angular. OO—Pipeclay, North Bloomfield, Nevada county, snow-white and very homogeneous. Before blowpipe with cobalt solution becomes deep blue; when wet is very plastic; under the microscope with a high power is seen to be largely very finely divided angular quartz; when washed, leaves no fine sand. Chemical analyses of silts and slickens from California hydraulic mines show them to contain:

	Per cent.
Silica	67 to 90
Oxide of iron	4 to 11
Alumina	3 to 12
Lime	
Oxide manganese	from trace
Magnesia	to 2 per c.
Potash	
Soda	
Specific gravity	2.3 to 2.66

The following extracts, which have a special bearing on this subject, are from one of my reports (Second Annual Report of the State Mineralogist of California, Sacramento, 1882): "From the examination of the hydraulic sands it is fair to infer that the same force that crushed the rocks, set the gold free, flattened the grains, and coated those which passed between the rocks and the grinding loe. "When I made the discovery by the use of the microscope that all the sands in the hydraulic mines were angular and not rounded by the action of water, as I expected to find them, I came to the conclusion that the river-beds had not been filled by force of water alone as generally supposed, but that we must formulate a new theory based on the new discovery. I naturally looked to ice as the agent and attributed the filling of the beds and the disintegration of the rocks to the action of glaciers moving over the land. This view, while it would account for most of the phenomena, did not account for all. The rounded boulders were a stumbling-block which could not be overcome, and their formation, by long-continued action of water, could not be made to harmonize with the angular condition of the sands. "Observations made in studying this very

interesting subject seem to strengthen the opinions of the advocates of the theory of extensive intermittent and almost universal glacial action on the earth's surface; no theory I am familiar with so perfectly accounts for the present condition of this sand. I find the resemblance between the finer sands and the diatomaceous earth of the State so marked that I am inclined to trace a connection between them. After making a comparison under the microscope, I returned to the former and made a critical and long-continued search for organic forms, feeling to a certain extent disappointed when I found none; yet the resemblance is so striking that it would seem almost proved that the hydraulic gravels and the diatomaceous earths have a common origin; the latter being brought down by streams and deposited in some quiet ancient lake, in which diatoms living and dying left their tiny skeletons in the slowly deposited silt. "It is well known that certain strata in the diatomaceous earths contain these interesting forms in greater quantities and in more specific varieties than they are found in others, which would seem to indicate that they were deposited in different geological eras, or at least at different intervals of time. "It is probable that the diatoms derived the silica required for their shells from quartz held in suspension or solution in water. Thinking this over, another experiment was made which established still stronger evidence as to the similarity between the finer silts and the diatomaceous earths. A portion of the former was holed in a silver dish with a strong solution of caustic potash. A large quantity of silica was dissolved, which proves that at least a portion of the silica had changed from its condition of quartz, and had assumed the nascent or soluble state. It is well known that diatomaceous earth is largely soluble in caustic alkalis, advantage being taken of it in the production of silicate of soda and potash on a large scale; and it is equally well known that quartz is only slightly acted on, except after being oxidized, and under pressure. I am aware that finely powdered quartz, long heated in boiling potash lye, slowly changes to the soluble state and enters into solution. In this experiment the solution was immediate and copious."

Coast Industrial Notes.

NEARLY 1000 men are employed in the coal mines at Roslyn, and the daily output is from 750 to 900 tons. ENOUGH of the steel rails for the Oakland and Berkeley electric railroad have arrived to start the work of track-laying ahead again. THE quarrymen at Penryn, Placer county, now work nine hours for a day's work, without change of wages from the ten-hour day. ON the 14th inst. the machine shops of the Northern Pacific R. R. Co. at Ellensburg, Washington, were destroyed by fire. Loss, \$100,000. ABOUT 250 men are now engaged in the work of construction of the suburban section of the Piedmont cable road. It is said that the cost of the entire system, including the Fourteenth-street line, will approximate \$1,000,000. IN the last few weeks ten ships and barks have left this port for various points in Alaska. On these vessels over 1000 Chinese have taken passage. They have gone to Alaska under contracts to work in the salmon canneries and fisheries. THE steamer Queen is fitting out at the Union Iron Works for the Alaskan route. Her deck-house is being extended and will contain 33 more staterooms, making 96 in all. She will run as an excursion boat from the Sound to Alaska. THE contract for the erection of the ten-story Crocker building on the Post and Market street corners has been let to Mahoney Bros., who will begin work at once. The cost of the building when completed, it is estimated, will be considerably over \$1,000,000. ANOTHER industry is to be located in Oakland. The crescent works of the Southern Pacific Co., until some weeks since established at San Pedro, Los Angeles county, and visited by fire there, will be situated in the Peraltastreet yards, by the shore of the estuary. NATURAL GAS has been found on Piries' ranch near Nordhoff, Ventura Co. There is no question of the existence of natural gas in many places in Ventura county in quantities sufficient to be worth looking after, but it goes to waste, except in Santa Paula canyon, where it is used by the Oil Company to run engines at their pumping station. CLOSE on to a million of dollars will be spent at Mare island on the completion of the monitor Monadnock. The Ironsides, Thetis, Alert and Ranger are all undergoing extensive repairs at the Navy-yard. It is expected that the Adame will arrive shortly. The Marion is also on the way. Both of these vessels will also need considerable repairing. THE lathers went on a strike last week for higher pay. Those who work by the day want an advance from \$2.50 and \$3.50 per day to \$3.50 and \$4, while those working by the piece want an advance from \$1.50 per thousand to \$1.75. The contractors, with very few exceptions, have decided to pay the advance in wages asked by the employees. The contractors say that the lathers strike about this time every year. During the dull season the

lathers work for very low wages, and when business picks up they strike for more. They will, according to the statements of the contractors, be back to their old figures in a few months, after the present building boom has subsided.

THE Watsonville *Pajaronian* says: The beet factory's lime and potash vats will be cleaned out before the next season's run begins, and it is estimated that there will be at least 700 tons of the lime fertilizer for shipment to the Sandwich Islands. Potash will also go to the islands. There is a scarcity of lime there, and this fertilizer will sell for a good price.

PALADINI & Co., owners of the fishing steamer U. S. Grant, have contracted with Wm. Stone, the ship-builder, to build for them another steamer to be used for fishing purposes. The dimensions of the new craft will be: Length, 65 feet; beam, 22 feet; depth, 9 feet. Her hull will cost \$5000 and her machinery about \$7500, and she will be completed in about two months. When finished she will sail in concert with the Grant, fishing off the port. The two will steam along about 500 feet apart and drag between them an enormous net.

The machinery from the Niles Tool Works, Hamilton, Ohio, has arrived at Mare Island Navy-yard. The machinery consists of three armor-plate bending-rolls to be used in the Mare Island Navy-yard. They can bend plates cold 4 inches thick and 27 feet wide of wrought steel. The largest of the three is 33 inches in diameter, with a 27 foot face, and 13-inch journals 3 feet long. The two smaller are 26 inches in diameter, with the same face and same length journals, 13 inches in diameter. The largest in itself weighs 86,700 pounds. The freight bill alone amounted to \$10,000.

CHARLES WHITE has established his shipyard, formerly at North Beach, on Oakland Creek. A two-story frame building has just been completed, containing 15 large sleeping-rooms, with dining-room, kitchen and reading-room, besides quarters to be used as offices, model-rooms, drafting-rooms, etc. On the banks of the estuary is a saw-mill, which is nearly completed. In it is all the latest and most approved machinery for ship-building. The black-smith-shop is located in the same building, and a large engine and 60-horse power boiler will furnish all the necessary power for hauling lumber and drawing vessels up on the ways. The marine ways have been completed, and at present 25 men are employed at the yards, and this force will be increased to 100 as soon as Mr. White can put them to work. One vessel is being constructed now. The vessel is one of 45 tons, and is being built by the Arctic Packing Company for salmon fishing in Alaskan waters. Mr. White has contracted for four vessels in all so far. One will be a four-masted barkentine, to be launched in August. Another will be a schooner, and a third a steamer. The timber for all these vessels now lies in the harbor ready to be used.

THERE are 10 broom factories in this city, the business being principally in the hands of two or three firms. Then, scattered throughout the country, there are, for example, two in Sacramento, two in San Jose, three in Stockton, two in Los Angeles and one in Red Bluff, with some others. The manufacture of brooms is also carried on to a considerable extent at the Industrial Home for the Blind at Oakland. Taken together, the private factories in the city and the blind asylum may be set down as having an output of about 200 dozen brooms a day, or 62,400 dozen—say in round numbers 750,000 brooms—per year. The brooms, which vary in weight all the way from one and a third to two pounds each, take about one ton of corn to every 100 dozen brooms. The number of hands employed in this city is about 150, 50 of whom, mostly white men, are in the pay of one firm, the balance being divided up among the smaller establishments and consisting principally of Chinamen. At present from \$75 up to \$120 per ton is being paid for broom-corn by the factories, with prices promising to advance owing to the scarcity of the California article as a result of the lesser area planted last year. The estimated production by the State is set down at about 500 tons for the last year, where in other years it has reached up to 1000 tons.

A MOVEMENT is on foot among the salmon cannery men and agents to come to some understanding whereby the production of the coming season will not be as large as it was last year. The most careful estimates show that there is still a stock ranging from 200,000 to 250,000 cases of 1889 salmon in the hands of the producers. Advice from Portland, dated April 15th, says: Owing to a dispute between the cannery men and the Fishermen's Union no salmon are being canned on the Columbia, and the headquarters of the salmon business is at present in this city. There are a good many fish running in the Willamette, and parties are fishing despite the union and selling tone of fish here for three cents a pound. The fish are being salted in barrels and shipped by the carload for Germany and Russia, where the salt will be extracted by some peculiar process and the fish canned, thus avoiding the duty on canned goods. Unless the trouble between the fishermen and the cannery is settled, a very large amount of salmon will be disposed of in this way. The fishermen on the Columbia years ago got 50 cents a fish. They organized as fish became scarcer and fishermen more numerous and got 50 cents, then 75 cents and finally \$1 a fish. This year they are striking for \$1.25.

Legal Points in Levee Building.

There was filed by the Supreme Court, recently, an interesting decision in the case of E. McDaniel, appellant, vs. M. Cummings, respondent. The defendant owns the west half of a certain section, No. 26, in Colusa county. Plaintiff owns land adjoining on the west. Still farther to the west, at a distance of about two miles from plaintiff's land, the Sacramento river flows from north to south. The land next the river is the highest, there being a gradual descent from the river bank to and beyond the land of defendant. When the river rises above the level of its banks, as it generally does several times during every rainy season, the water flows off to the east or southeast, across the land of the plaintiff, and other lands similarly situated, to and across the land of defendant and other lands in the same relative situation. It does not flow in any narrow or defined channel or channels, but in a broad sheet covering a wide surface.

When the river falls below the level of the banks the overflow cannot, of course, find its way directly back into the stream, and consequently the lands near the river are drained by the spread and flow of water toward the east and southeast, across the lower lands, such as those of defendant. Left unobstructed in their natural and accustomed flow, these waters soon pass beyond the plaintiff's lands, leaving them fit for cultivation. But recently the defendant, without intending to injure the plaintiff, and acting upon the bona fide belief that he had the right so to do, commenced and was proceeding to complete a levee or embankment along his west line, the necessary effect of which will be to prevent the flood-water from passing over his land, and to set it back upon the plaintiff's land, causing it to cover a larger area thereof, and to remain thereon for a longer period than it otherwise would.

The plaintiff thereupon commenced an action to enjoin the defendant from erecting or maintaining said levee. A temporary injunction was issued upon the filing of the complaint. Afterward, on motion of the defendant, and upon affidavit showing the state of facts above set forth, the Superior Court dissolved the injunction on the ground that the defendant in erecting and maintaining his levee was acting within and according to his rights. From this order dissolving the injunction plaintiff appealed, and on September 12, 1889, an opinion was filed by the Supreme Court reversing the order upon the authority of *Ogburn vs. Connor*, 46 Cal., 346. A rehearing was subsequently granted upon petition filed on the part of the defendant, in which the correctness of the decision in *Ogburn vs. Connor* is assailed, as is also the construction given to Section 801 of the Civil Code.

Chief Justice Beatty, who writes the opinion, says: "I think there can be no doubt that we were in error in holding that Section 801 of the Civil Code gives to the owner of higher land an easement for the discharge of surface water upon lower adjoining land. That section merely enumerates the different kinds of burdens or servitudes upon lands that may be attached as incident or appurtenant to the other lands, or, in other words, it is a mere definition of easements appurtenant, and makes no pretense of prescribing or regulating the manner of acquiring them."

"If the owner of the land next to the river will not, either by himself or in combination with those behind him, erect a levee on the bank, he ought not to be allowed to prevent them from protecting themselves, merely because by so doing they prevent his higher land from being drained of the flood waters as rapidly as it otherwise would be. Because his land may be cultivated without artificial protection, he ought not to be allowed to prevent others from using proper means to make their lands productive; and what is true of the owner of the river-bank is true in the same sense of each successive owner back of him. It is the interest of all to combine and share the expense of placing a levee on the bank, by which all will be protected; but if those in front will do nothing for themselves, they must not be allowed to stand in the way of those whose necessities compelled them to act. Order affirmed."—*Record-Union*.

MINING ENGINES.—The Chicago branch of the Lidgerwood Manufacturing Company, New York, reports the general state of trade as being very good. They have recently closed many large orders, among which we note the following: A large double friction drum mining engine and boiler to the Shafer mine of Crystal Falls, Mich., a duplicate of same to the Mansfield Iron Mining Company of the same place, and to the Nanaimo Mining Company of Iron River, Mich., a large single drum, double cylinder reversible mining engine, besides a large double friction drum mining engine with boilers. They have also sold a large double cylinder reversible hoisting engine to the Valley Mining Company of Bessemer, Mich., four large reversible hoisting engines to the Schlesinger (Iron mining) syndicate, and many small exploring engines intended for the Lake Superior mining regions. The recent boom in the iron world has caused a great deal of activity among manufacturers of mining machinery, and especially so in the case of the Lidgerwood Manufacturing Company.

Sampling Auriferous Quartz.

A Simple Working Test for Amount of Gold.

In the Fifth Annual Report of the State Mineralogist of California, there appeared an article written by Melville Attwood, E. q., of this city on "A Simple Working Test for Determining the Quantity of Gold Mechanically Combined with Auriferous Vein-Matter." Mr. Attwood has been for the past 50 years more or less practically engaged in gold mining, and the great importance of some simple and reliable test has constantly presented itself to his notice. We have long felt and experienced the want of some practical and correct way of estimating the value of auriferous vein-matter, or gold quartz, which would demonstrate what could be obtained by careful milling—a test that could be applied at the mine, of so simple a character, that those witnessing the trial, though not conversant with mining or milling, would be able to judge of the result, and, if necessary, satisfy themselves of the safety of their money, in case they wished to invest for the further development, or even the purchase of the mine. Mr. Attwood at last determined to devise some plan to meet the requirements, and after exhaustive experiments he has in a great measure succeeded. From his article, above referred to, we condense the essential features, omitting that which relates to the occurrence of gold, etc.

The gold quartz from which the working test is to be made should be taken from the lode at the ends or face of the drifts, becks or crop-pings, by an experienced, practical miner in a quantity of not less than 13 cubic feet, and should be of as true an average of the rock in sight as can possibly be obtained. The broken 13 cubic feet should then be conveyed to the place selected for making the test, and with spalling hammers broken to the size of macadam stuff, of which, after a thorough mixing, two hundred weight, representing as nearly as possible an average of the whole, should be taken and placed on a piece of canvas about two yards square, in the center of which is a stamp die, and then, with cobbing hammers, the two hundred weight should be reduced small enough to pass through a two-inch riddle; the die is then removed and the canvas raised from each side, so that the broken quartz be well mixed, from which two samples of four pounds each can then be taken. A "heavy bucking hammer," with a large-sized "bucking iron," on a piece of canvas so spread or placed that it will collect what flies or is thrown from under the bucking hammer, will reduce the macadam stuff much more rapidly, and is perhaps better than cobbing. (A bucking hammer is formed of a piece of iron six inches square and one inch thick, adapted to a wooden handle.) The cobbed four pounds samples should then be passed through Taylor's hand rock-crusher till it is fine enough to go through a sieve with 30 holes to the linear inch, or even finer, if considered advisable. The following is a description of Taylor's crusher:

The design of this small machine is to enable a person quickly and easily to bring to fine powder the hardest ores to be assayed or sampled or worked. Both jaws are faced with hard white iron, the lower parts of which are plain surfaces, between which the ore is crushed fine. The stationary jaw *B* has its lower plain surface at an angle to the upper or corrugated surface. Lower part of this jaw is adjusted by screws to crush fine or coarse. The movable jaw *C* is operated by the hand-lever *A*. Jaws, links and toggles as shown in Fig. 2. The jaw *C* has its corrugations horizontal to facilitate forcing the ore down at each stroke of the lever. This jaw has a vertical and horizontal motion, the link *E* forcing plain part of jaw *C* forward with great force at each downward stroke.

The whole can be quickly taken apart for cleaning, after each lot is worked, by simply lifting up the lever and throwing it out as in Fig. 2 of the drawing. This crusher is much improved by putting a hard iron plate *E* each side of the jaws to prevent the escape of fine ore, and by making the side straps, *D*, of malleable iron, so they will not break or pull apart as the great leverage has done to cast iron.

The lever has a rubber covering where grasped by the hand, and a rubber cushion where it strikes the bed-piece, to prevent jar and noise.

Each machine has a cover (not shown) to prevent pieces of ore from flying out, and is furnished with a wrench and dust-brush. Extra jaws and other parts can be had. Weight complete, 35 pounds.

Taylor's hand crusher has many advantages over the common mortar and pestle; first the rapidity with which it will crush the quartz to the desired fineness without the stamping and grinding action of the mortar and pestle, by which action so large a proportion of the gold is laminated and floats away when attempts are made to obtain the gold by mechanical assay-washing.

Those conversant with mining and milling know that there are three modes of reducing gold quartz, copper, silver, lead and other ores, namely "crushing," "stamping" and "grinding." The first is effected by horizontal roller rock-breakers, the second by stamps, and the third by edge mills, pans, arastras and mill-stones.

The great objections to the two latter modes of reduction in the treatment of gold quartz

are the lamination of the gold, and the production, when silver, copper, lead and other ores are so reduced, of so large a quantity of slime.

The ore in the condition of slimes, like those from the Comstock mills, is generally in such a state that, so far as I know, all attempts up to this time to profitably recover the metal have failed.

The various simple appliances employed for panning out gold, and the separation of it from pyritic matter and earthy materials, are as follows:

First—"The flat shovel," the use of which is by Cornish ore-dressers termed "vanning." The foremen of the different dressing-floors where copper, lead and tin ores are assayed and concentrated for market, necessarily "van" with considerable skill. Vanning is occasionally brought into use in testing for gold. Some of the Cornish and Swansea assayers years ago were perhaps wrongfully accused of "shovel trying," as it was called, instead of making a fire assay of the samples of copper ore sent to them.

Second—"The pan," as used by placer miners and prospectors. It is made out of one piece of sheet iron, and for washing gravel and cleaning up in milling it is vastly superior to any other utensil. A small riddle (picking riddle), similar to those used in sorting lead and other ores, would greatly assist the operation in washing small quantities of gravel. The earthy matter would be more easily removed or cleansed than by rubbing the gravel between the hands. The picking riddle, with about eight holes to the linear inch, has two long handles fixed to it to work it. A large tub, partly filled with water, is required. The riddle, with the gravel in it to be washed, is then immersed in the water, and by a sharp, quick, half-rotary motion the clay or soil is soon removed from the pebbles or gravel. What will not pass through the riddle is then emptied on a table or board so that it can be examined to see if there are any nuggets or cement that require crushing.

In estimating the value of "drifting gravel," it is best to do so by the cubic foot, and in the absence of sluices, to use the picking riddle and then to wash out the gold with a pan. "In place," the average small gravel will weigh 18 cubic feet to the ton; on the dump, 27 cubic feet.

Third—"The horn spoon," used principally, I believe, by Mexican miners and millmen, to test the mercury in the different stages of the "Patio" and other amalgamation processes. Many of our California experts use it in prospecting for gold. It is made of various shapes and sizes, but all of them too small to treat a quantity of pulp sufficient for a washing test for gold, besides which the grease from the finger-ends in stirring up the pulp in the spoon causes a large proportion of the scale gold to float away on the water, particularly that form of gold generally met with in the cellular portions of the quartz and mostly associated with ferruginous matter. To prove how easily the gold attaches itself to the grease, take some sea-beach gold, put into the horn spoon and rub it with the ends of your fingers, then add water to it, and you will find the greater part of it will float away. Nevertheless, with the horn spoon the presence of gold may be detected, but I cannot recommend it for a mechanical or washing assay, the results not being reliable—in fact, mere guesswork.

Fourth—"The batea," a wooden bowl or vessel used for washing gold by the Mexican and Brazilian miners, and though these two implements differ very much in size and shape, in skillful hands very good results are obtained from both. My improved form of Brazilian batea, a description of which will be found in your report for 1884, is the result for many years of study. My first attempts were made of zinc, one of which I presented to the Jernyn Street School of Mines, London, in 1851, a cut of which will be found in "Philips' Metallurgy," 1859.

The pattern of my latest improved form I have given to John Taylor & Co. and Mr. Justinian Caire of this city, who are making them in good form and of suitable wood. The improved batea, if skillfully handled, will give very accurate results, showing nearly every particle of the mechanically combined gold in the vein-stone. It is also very useful as a concentrator to find the percentage of pyritic matter in the ore.

When the miner is desirous of making a very accurate working test, two bateas should be used, so that the tailings from the first operation can be washed over again. The right-hand fingers should also be covered with rubber coats, so that the grease from them may not float the gold; a little washing ammonia should also be added from time to time during the washing or panning out.

In case there is any talcose or greasy matter in the samples of vein-stone, it should be soaked in boiling water with a little caustic soda for 10 or 15 minutes before panning out, which can be done in a large glue-pot.

When the gold and pyritic matter are brought together in the center of the batea, and well freed from the gangue, allow them to be covered with one or two inches of water, and then with a "bar magnet" remove all magnetic iron, which can be easily effected, but care must be taken at the same time that none of the gold is picked up with the iron; by striking the magnet slightly against the side of the washing-tub, the iron will fall from the magnet.

(Continued on page 287.)

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Alameda.

CHROME.—Livermore *Herald*, April 17: There is to be a marked activity in the chrome industry in this district this summer. Work has been resumed at both of the Cedar Mountain mines, and the mineral will soon be coming into town again as rapidly as ever. Messrs. Pitcher & Knight are prepared to buy ore in any quantities, at good prices. Considerable ore is out at the Douglas mine, and work is in progress at the Ab Mendenhall mine. This industry, when actively prosecuted, puts considerable ready money in circulation in our town.

THE EUREKA COAL MINE.—Livermore *Herald*, April 17: The history of the present work of development on the Livermore and Corral Hollow coal mining districts begins with the failure of Wm. T. Coleman, which threw his coal lands on the market. These lands, extending as they do over the Livermore, Eureka and Summit veins—the three great coal veins of this district—with a frontage on Corral Hollow creek, 400 feet below the workings of the Livermore mine, held the key to the situation. Coal could be taken out without hoisting, while at points a level tunnel would have above it nearly 700 feet of coal. Gutmman and others of the Livermore Co. saw this and secured a bond on the land. They then cleared out the old O'Brien tunnels, so as to show the coal veins, and entered into negotiations with Eastern capitalists to sell the property. A coal expert was sent on by these parties, and his report was the most intelligent statement regarding the district ever made. On the strength of this report, John Treadwell, of Alaska mining fame, bonded the property and agreed to thoroughly develop it. He is now running a tunnel in a northerly direction from the O'Brien place in Corral Hollow creek, to tap all the known coal veins and whatever else it may encounter. This tunnel, to reach the Summit vein, must be 3000 feet in length. It is 9x10 in size, and has been driven into the mountain 1400 feet. In places it is timbered, 12x14 timbers being used, and put together in such a way as to secure great strength. There are long stretches, however, where the rock is firm sandstone, which stands without timbering. At 450 feet about a foot of coal was encountered. At 500 feet the Livermore vein was passed through—five feet of good coal. Then followed numerous small veins of from two inches to two feet, and at 1100 feet the mammoth Eureka vein was struck. This is fully 16 feet wide, with 12 feet of solid coal. From this point the tunnel is but 6x7 in size, and needs no timbering. It is being pushed forward by two shifts at the rate of 10 feet every 24 hours. The rock is not hard, and it contains very little water. Preparations are now in progress to run lateral tunnels along both the Livermore and Eureka veins. These three tunnels will be pushed with energy, and an additional force of men will be put on in a few days. They will be run alongside the veins to a distance of about 1500 feet on each. This will thoroughly test the value of the mine. It seems to be the intention of Mr. Treadwell to thoroughly ascertain the value of his mining property before taking out any coal or building a railroad to it. He has, however, become sufficiently convinced of its worth to warrant him in securing the title to it, which he did this week. There were three groups of interests—those of the assignees of Coleman, those of the secured English creditors, and those of the Eureka Coal Mining Co. The total sum paid was \$50,000. Mr. Treadwell had previously purchased the property of the Livermore Coal M. Co., and has secured title. This gives him more than two miles in length on all three of these veins. All have been thoroughly prospected at the west end, and the great tunnel has opened up two of them at the east. These veins extend in very nearly an easterly and westerly direction, a trifle south of east and north of west.

THE EUREKA CAMP is now quite a lively place. About 25 men are employed at the mine on both shifts at present, and this number will be largely increased when work is begun on the lateral drifts. Only the best miners are employed, and every portion of the work shows that fact. A new superintendent, J. J. Kermin, took charge of the mine this week.

Amador.

PLYMOUTH CON. MINE.—*Ledger*, April 14: In the tunnel on No. 2 (Indiana) they are running two crosscuts. One is in 39 feet and one 18 feet.

AMADOR GOLD MINE.—Mr. Harrison, the manager of this property, returned from San Francisco on Monday evening. In relation to the attachment suits, he informs us that they were instituted by Rankin, Brayton & Co., foundrymen of San Francisco, and that the company disputes the claim. There is no doubt, however, that the matter will be satisfactorily adjusted before long, without involving tedious litigation. At any rate, it is not likely to interfere with the starting of the mill. The sum of \$10,000 was received Monday and the wages of employees all liquidated up to April 1. It is expected that the mill will be ready to commence operations about the 1st of May. J. Irving, formerly of the Kennedy mill, has been engaged as mill-man. About 30 men have been engaged for underground work, and they will commence operations next week. The controversy concerning the right of way for the tramway was finally adjusted Thursday. The necessary papers giving the company the right of way on the present line have been signed and the same placed in escrow pending the arrival of the purchase-money from London. We understand the Morley M. Co., that operated the Weitzel mine in Hunt's gulch for a few months, is about to close out its interests and retire from the mining field in this country.

Calaveras.

IMPORTANT STRIKES.—Calaveras *Prospect*, April 19: It is reported that Frank Cuneo, of San Antonio Camp, has made a valuable find in his mine on Indian Creek Ridge. The vein is from three to four feet wide, and is very rich. It is claimed by Mr. Cuneo that this vein is a continuation of the famous Esmeralda Lead, owned by E. A. Davis and F. J. Martin. Farther up the same ridge, another valuable discovery has been made by L. R. Kline. He has uncovered a vein which has been prospected for years on account of the rich "float"

continually found in the neighborhood, but in vain, until recently discovered by Mr. Kline. The vein can be traced for a long distance, and for over 1000 feet shows a good strong vein of first-class ore, containing visible gold in many places. The walls and gouge show a true fissure formation, and the quartz is dark blue in color. This is undoubtedly one of the most important discoveries made for some time in this region, and we should like to see the property opened up in the proper way. Still farther up the Cunniffe and Driver mines are located. These mines were visited recently by representatives of Eastern capital with a view to purchasing, and it is not unlikely that a transfer may be made in the near future. All these properties are situated on the Indian Creek Ridge—which comprises the Indian Creek mining district, and it has sometimes been called the Bonanza Ridge—commencing with the old Calaveras mine on the extreme eastern limit, and ending with the Esmeralda group of mines on the west. Work has been resumed on the Jesus Lopez mine. A tunnel is to be run directly on the vein, and connection made with the shaft at a depth of about 200 feet.

RICH PROSPECT.—It is reported that at the Union Shaft gravel mine on Central Hill, one day last week, from 4 pans of dirt 4 ounces of gold was obtained. This is a splendid showing, and if correct would warrant the idea that the mine is a bonanza.

THE UTICA MINE.—There are no new developments in the Utica mine relative to the recovery of the bodies buried there. Two have been in sight for some time, but cannot yet be extricated.

Inyo.

THE WHALE.—*Inyo Independent*, April 18: Such is the appropriate name for a mining claim in Saline valley, located by J. White Smith, Ambrose Smith, J. Welsh, and Arlie Mairs. The claim is located near the base of Ubaheba peaks, about 11 miles east of the works of Conn & Trudo. The ledge is 40 feet wide on the surface and this large mass of ore lies exposed for a comparatively long distance. The vein has three separate streaks, differing from each other in color and general character. A ton of ore was gathered, one-third of it taken from each of the streaks, and all of it as nearly as possible of average quality with the whole ledge. The ore was shipped to San Francisco, worked, and yielded as follows: Gold, \$34 per ton; silver, \$6; copper, 13½ per cent. The presumption is that all the gold was obtained in the ore from one of the streaks; and if this be true, the ore of that streak contains gold to the amount of \$102 per ton. It is certain that nearly all the silver was contained in another of the streaks, while copper is more or less diffused through the whole mass, but chiefly in the third streak. From this third streak tons of ore can be taken out that will carry 40 per cent copper and even more. The locators of this immense ledge are making arrangements for its development. The work done by Conn & Trudo in developing the borax deposits of Saline Valley, making a good road and otherwise drawing attention to that region, has led to a closer examination of the country for other minerals.

Mariposa.

WHITLOCK'S.—*News*, April 19: Heisser & Perego made another cleanup at the little prospecting mill on Whitlock's last Saturday, after crushing six tons of quartz which they had set aside as refuse ore, intending to work it when they might have better milling facilities. The result was much better than they had anticipated, the ore yielding 5 ounces and \$4, or \$89 at \$17 an ounce, or a fraction less than \$15 a ton. Some piratical thieves made a descent on the ground-slucers of Jake Teats and old John Geary about two weeks ago, and raked in nearly all the amalgam. No clue has yet been obtained to the identity of the scoundrels. It is pretty rough, after working all winter in all sorts of weather, to have the proceeds of their labor jayhawked in that style. Both men are old pioneer miners, well advanced in years. Geary is nearly 70 years of age, has a family and is a cripple. Ellingham & Grove have the foundation for their new mill ready for the mortar beds. The machinery is being hauled to the millsite.

Nevada.

OMAHA.—*Tidings*, April 19: The Omaha is employing over 100 men on day's pay, and this week the hoisting plant on the Lone Star shaft will be started. Notwithstanding the heavy drafts on the company's treasury for dead-work and improvements, a very respectable surplus is on hand. The cave in the Homeward Bound shaft is a mean one to handle, and there is much water to contend with. The Hartley has a full force of men at work and the mill is running on company ore. The air tunnel has not yet been completed, "blowers" supplying air in the meantime. The Pittsburg is practically clear of water and the new ore cut recently is holding out most encouragingly.

MENLO MINE.—*Union*, April 18: The shaft of the Menlo mine is being retimbered near the surface, as the old timbers have been found decayed. There has been a cave in the shaft 60 feet from the surface which will take a short time to get through, and then there will be no further impediment to clearing the shaft to its full depth, 250 feet.

A BIG PUMP.—A 16-inch plunger pump for the North Star M. Co. has just been cast at Nevada City. The castings are of superior quality. In all, the pump and connections will weigh about seven tons. It will be several months before the pump and connections will be ready for delivery.

CONTRACTS.—*Grass Valley Union*, April 17: Contracts have been made for the machinery and lumber for the pumping and hoisting works of the Ben Franklin mine, and the lumber is to be hauled to the mine immediately. The machinery purchased is the same that was formerly used in the El Capitán mine, at Town Talk. Contracts have also been made for the lumber for the new works to be erected at the St. John mine, and the hauling of the same is about to be commenced.

ORE SHIPMENTS.—*Eureka Sentinel*, April 19: Thirty E. & P. carloads of ore left the railroad depot in transit to Salt Lake during the week. We learn that as soon as the New York Caoyon road is opened, hauling from the Diamond, Lord Byron and other mines in that locality will be resumed.

Placer.

SHADY RUN.—*Cor. Placer Republican*, April 16: The Blue Bluff mine has been worked for several years by the Wedgewood Bros. It has been both a hydraulic and drift mine. A few years ago it yielded a vast amount of gold in large nuggets,

but it has always been very spotted. Adjoining this is the North America. This also paid well in years gone by. H. K. Devey, one of the shareholders of the famous Hidden Treasure at Sunny South, was the last to work this mine, which has always been drifted; but Mr. Devey is confident that it would pay well to be hydraulic. The Haub joins the North America. Conrad Haub is the owner of this mine. Several tunnels have been run to work it, but all too high. A few years ago Mr. Haub started a tunnel, lower than the rest, which he has been driving ahead from time to time as his means would permit. He expects the tunnel will be about 1000 feet in length when completed. The next mine is the Elite Con. Here a tunnel has been run through a cement formation 1100 feet, where a shaft was sunk to the depth of 158 feet, through a number of different strata, some of which were cement, sand, pipe-clay, lignite and gravel to the bedrock; but it was not far enough in, as the bedrock was pitching into the ridge. This work was all done by hand-power, and as the water came in so fast the shaft was abandoned, and now the company propose to sink an incline and use the same kind of power as is used at Towle Bros.' pulp-mill to hoist the pulp to the level of the railroad-track; that is, they will construct a tramway in the canyon at the mouth of the tunnel where a car filled with water will bring up the carload of dirt from the bottom of the incline at the back of the tunnel. This is the only attempt that has been made to develop the channel which is supposed to lie under the lava ridge between Canyon creek and Blue Canyon. Mr. Harvey's mine has been worked with the hydraulic process. When that was stopped, Mr. Harvey began to get it in shape to drift and was getting very favorable prospects, but was compelled to give up work on account of ill health. Unless all indications fail, this mine will be worked with good results. About the latter part of October last, Mr. Hoover of Alta began the construction of a large flume, to carry water from Blue Canyon to what is known as the Fannon mine, situated on the hillside several hundred feet above the bed of the canyon. Mr. Hoover expects to be taking out pay soon. S. Jordan of Dutch Flat has purchased the Hovey quartz mine in Blue Canyon, and will commence operations soon.

San Diego.

STONEWALL.—*Julian Sentinel*, April 18: Waldo Waterman was in town yesterday. He says the new machinery of the Stonewall is working nicely, crushing about 75 tons of ore per day. He informed us it is their intention to prospect several new ledges on the grant this summer. The contract for sinking a shaft on one has already been let, and the work commenced to-day.

Shasta.

REDUCTION WORKS DESTROYED.—*Redding Free Press*, April 16: The Redding Reduction Works were totally destroyed by fire Wednesday night. The works were owned by Billy Conant. W. H. Fowler, the mining expert, estimates the loss of machinery at about \$13,000. Mr. Fowler took charge of the plant several weeks ago, and since has expended not less than \$1000 in repairs and additions. Everything was complete to the smallest detail, and it was the intention to start up full blast next Monday. The works were insured for \$3500. The most possible theory is that the building was deliberately set fire by an incendiary.

NUCKET.—There is on exhibition at the Bank of Shasta county a \$500 quartz gold nugget. It was brought to town last Monday by parties who are not prepared to have their names published at present. It is said that the same parties have another nugget in their possession that weighs 17 ounces. If they have a ledge of the same sort of stuff it is the richest mine on earth. There will be a rush of prospectors to the spot when the location of the find is made known.

NEW COMPANIES.—Four new companies are operating in the mines of Shasta county this year—the Chicago Co. at Muletown, one at Whiskeytown, one on Grizzly gulch and another in the Old Diggings district.

CALUMET.—Dr. Garlich of the Calumet mine has returned from Ohio. Also A. B. Paul from S. F. Work on the mill and mine will be resumed. The Spring creek ditch will be repaired, new flume erected, and general repairs made from the ravages of winter.

DRY PROCESS.—Four gentlemen from Chicago are putting in a patent dry process sulphurets-working plant at Middle Creek station. It is said they have made a success of their patent process in the Rocky mountain mining fields, and concluded, after a survey of the field, that Shasta county was the most promising district on the coast in which for them to operate. Their machinery has been shipped from the East.

WHISKYTOWN.—*Cor. Shasta Courier*, April 19: The new camp being opened up here is located on the divide between Spring and Whisky creeks, south of Iron Mountain. There has been a number of locations made, and for the amount of work done, shows as well as anything in the county. The Iber Bros. are sinking a shaft on an 8-foot ledge. They are down 50 feet, and it prospects well from top to bottom, and carries heavy clay gouge. It shows for a great mine. Meed & Williams are sinking on another large ledge and are down 40 feet in good ore all the way, and it shows fine. Small & Lyman have two locations. They are prospecting, and have on one ledge a pay chute they have crosscut on the surface in several places a distance of 900 feet. In no place does it carry less than 55 per ton in free gold, and from that into the hundreds, and has an average width of three feet. This is the best showing for the amount of work done I have ever seen in the county. This is a good field and will no doubt prove one of the noted mining camps of the county.

IRON MOUNTAIN.—Col. Magee and Charles Camden went up to Iron Mountain this week on a visit of inspection to the mine and works there. A force of laborers has been at work for some time putting everything in order that was demoralized by the winter storms, and the mill will be put in operation next week.

Sonoma.

COAL INDICATIONS.—*Santa Rosa Republican*, April 16: T. J. Brown of Bennett Valley brought to town this morning some fine specimens of lignite found in Bennett Valley creek on the place of A. Benjamin. The specimen found in the creek is a pine log 12 feet long and 4 feet in thickness, almost

a pure lignite and strongly impregnated with gas. The supposition is that it is afloat from the Sonoma mountains on the north side, where a large body of pine timber is located, and is a continuation of the coal vein that has cropped out on the west side of the mountain on the lands of Thos. Hopper and F. Lacque.

NEVADA.

Washoe District.

OVERMAN.—*Virginia Enterprise*, April 19: The stopes on the 1200 level are yielding about 200 tons of ore a week. This averages about \$18 a ton. A fair proportion of prospecting is being done.

JUSTICE.—The north drift, 622 level, is passing into quartz that carries some metal. The mine is yielding about 200 tons of ore a week, the average assay of which is over \$26.

SEG. BELCHER.—All prospecting work going on as usual.

CHOLLAR.—The east crosscut, 80 feet south of north line, 750 level, is out 216 feet; face in porphyry. The east crosscut, 80 feet south of north line, 850 level, is out 125 feet; face in porphyry.

POTOSI.—The east crosscut, 300 feet south of north line, 850 level, is out 196 feet; face in porphyry with streaks of quartz which give good assays. East crosscut 400 feet south of north line 850 level is out 178 feet; face in porphyry. The winze below the 930 level is down 52 feet; the bottom is showing stringers of ore of good grade. The raise above the 930 level is up 99 feet; the roof is in quartz giving assays of from \$20 to \$45 a ton.

CON. IMPERIAL.—No. 1 crosscut on the 500 level is advancing in a promising formation, which consists mainly of porphyry and quartz.

CROWN POINT.—Work on the old west crosscut on the 500 level is making good progress. The 300 winze is down 22 feet. The bottom is in good ore. The north drift from the 350 level stoop to connect with it is completed. Shipped to the mill during the week over 750 tons of ore, the average battery samples of which will be about the same as last week.

SAVAGE.—On the 300 level the south and north lateral drifts are advanced respectively 169 and 94 feet. Are extracting ore from the 400, 500, 600 and 750 levels, and are running prospecting drifts on each of these levels. During the week have milled over 450 tons of ore of the average value, as per battery samples, of about \$22 per ton.

BELCHER.—The 200 south drift from the west crosscut is out 190 feet, having been extended 15 feet during the week. The face is in low-grade quartz. The 300 west crosscut is out 72 feet. The face is all in quartz showing spots of pay ore. The 600 south lateral drift is out 232 feet, having been advanced 15 feet since last report. The 800 joint crosscut is out 333 feet, and the face is in hard porphyry.

ALPHA.—On the 500 level the west crosscut continues in hard porphyry. On the 600 level the south lateral drift is still in soft porphyry that carries many stringers of quartz.

ENCHOUER.—On the 500 level the east crosscut is still advancing in porphyry. On the 600 level the north lateral drift is in a favorable mixture of quartz and porphyry.

HALE & NORCROSS.—About the usual amount of ore is being extracted from the ore-producing sections, the average assay of which is about \$20 a ton. A good deal of prospecting work is being done on the 500 level. The repair work and re-timbering of old drifts required to be reopened will soon be completed.

NEW YORK CON.—The exploration work in this mine is being prosecuted on the 650, 800 and 950 levels. On the last-mentioned level the south drift is passing into quartz that yields promising assays. The formation on the levels above is soft and favorable.

WARD COMBINATION SHAFT.—On the 1800 level the east drift is being steadily advanced in a porphyry formation.

SCORPION.—The southwest drift on the 630 level continues in porphyry.

UTAH.—Good headway is making in the work of cutting out a station on the northwest side of the shaft station at the 725 level.

BEST & BELCHER.—On the 1000 level, east crosscut No. 1 has been extended 15 feet; total length, 342 feet. Formation, hard porphyry. On the 1200 level the north drift has been cleaned out and repaired 28 feet; total distance, 578 feet.

GOULD & CURRY.—On the 200 level west crosscut No. 2 has been extended 16 feet; total length, 150 feet. Formation, hard porphyry. On the 400 level west crosscut No. 2 has been extended 25 feet; total length, 585 feet. Formation, soft porphyry.

CON. CAL. & VIRGINIA.—About the usual quantity of ore is being taken from the 1300, 1435, 1500 and 1600 levels. No. 3 crosscut on the 1435 level is in a mixture of quartz and porphyry giving low assays. On the 1650 the south drift from the main west drift from the C. & C. shaft is in good ore. Good ore is also being stoped from No. 8 raise on the 1650 level. The usual shipments are being made to the river mills, and the average of the battery assays will be about the same as last week.

ANDES.—During the past week drift on the 420 level advanced 80 feet. Formation, porphyry and clay with stringers of quartz. Repairs on 350 level will soon be completed.

OCCIDENTAL CON.—The mine is looking very well, and ore is regularly extracted from all the stopes on the 400 and 450 levels. The crosscut on the 550 level continues in soft porphyry and clay. A south drift on this level is developing a considerable amount of low-grade ore. The south drift from the north line on the 450 level is still yielding high-grade ore.

SIERRA NEVADA.—The southwest drift on the 630 level is still in a porphyry formation.

UNION CON.—No. 1 east crosscut on the 1465 level continues in hard porphyry.

MEXICAN.—The crosscuts on the 1465 level are in a porphyry formation that shows some small stringers of quartz.

OPHIR.—In following the ore streaks found on the 1300 level some good milling ore has been encountered. The mine is now yielding nearly 200 tons a week.

CONFIDENCE AND CHALLENGE CON.—All prospecting work making favorable progress, and in places some low-grade ore has been met with.

ALTA.—Work is progressing on the 825, 925 and

1040 levels. The prospecting drifts are nearly all being advanced in favorable material, and in one or two low-grade ore is being developed. The mill is kept running steadily to its full capacity of 45 tons a day. The average value of the ore worked remains about \$20.

YELLOW JACKET.—The ore-producing sections continue to look well, and prospecting work is kept up. The ore shipments average about 65 tons a day.

SILVER HILL.—Exploring work is in progress on the 160, 260 and 400 levels. The prospecting drifts are in a favorable formation of clay and porphyry. In this soft material ore is liable to form.

Columbus District.

MT. DIABLO.—Inyo Register, April 19: The Mt. Diablo at Candelaria is working 30 tons and upward of ore per pay in the 10-stamp mill at Soda. For a time it is claimed the mill has worked 35 tons daily. About 60 or 70 men are at work in the mine. The Belleville mills are not being refitted; on the contrary the upper mill is being dismantled, and many of its timbers will be put into the Holmes. The lower mill may in future be called into service again, but certainly will not be very soon.

Flowers District.

LEAD ORE FOR SMELTERS.—Virginia Enterprise, April 18: There are thousands on thousands of tons of lead ore in the old North Bonanza mine in Flowers district. It is that mine may be found veins of solid metal 20 to 30 feet thick. The galena contains a small amount of the precious metals, almost enough to pay for working. It would seem that it would be just what is wanted for mixing with dry ores, but we here do not pretend to know much about smelting. The mine has for years lain idle. We are of the opinion that it would pay some of the furnace men of Salt Lake to take a look at this bonanza of galena.

Tucacora District.

NEVADA QUEEN.—Times-Review, April 18: North gangway from 600-foot level of North Belle Isle has been advanced 21 feet.

NORTH BELLE ISLE.—The concentrator will be started as soon as feed can be got in to run the teams. The stops above the 300 continue to look about the same.

NAVAGO.—The east crosscut from the end of the south, 150-foot level, extended eight feet and suspended, and work resumed in the opposite crosscut.

BELLE ISLE.—North drift from the crosscut near the Navajo line, 250-foot level, extended five feet; face is all in vein showing some low-grade ore. South drift from the crosscut from the 350-foot level, extended eight feet; the vein is strong and shows some good ore.

GRAND PRIZE.—500-foot level—West drift from north crosscut extended seven feet; east drift on north vein extended 21 feet, and west drift 20 feet. Faces of both drifts show a strong vein, with streaks of ore through it. On the 400-foot level have started an east drift on north vein to explore the upward continuation of this ore from the 500-foot level.

DEL MONTE.—First level—North gangway has been extended 15 feet and No. 3 crosscut started east in the vein. North drift from joint crosscut advanced 12 feet, seams of ore in the face.

NORTH COMMONWEALTH.—First level—No. 2 east crosscut extended 16 feet, in vein formation. East drift from top of raise is in 16 feet; 2 feet of ore.

COMMONWEALTH.—Fourth level—East crosscut from north gangway extended 14 feet, cutting into a vein of quartz four feet, assaying from \$2 to \$8 per ton. Upraise from south gangway up 19 feet; does not show so well as last reported. Concentrator running regularly; crushed during the week 530 tons, \$16.45 per ton.

ARIZONA.

BRADSHAW MOUNTAINS.—Journal-Miner, April 14: S. J. Hodgdon left to-day for the Bradshaw mountains, to work on the Roanoke, Alice and Pearl claims. F. G. Goodwin brought in a bottle of gold-dust to-day which he bought from placer miners along the Hassayampa. A. J. Rubert came in from Skull valley last evening, where he is engaged in putting up his Huntington mill. He expects to be able to start up soon. Frank Fentoo has recently discovered a ledge near Goodwin's station at Willow creek, from which he has had assays in silver of from \$500 to \$600 per ton. W. H. Harlan, of the Howard mine, brought in a 52-ounce bar of gold yesterday, which he shipped to the mint at S. F. The mill is running successfully. The Trinidad & Castle Creek Co. has executed a deed of trust to H. J. Alexander for all the mines owned by the company in Yavapai county, for \$11,612.10. The Del Pasco mill has been thoroughly overhauled and repaired, and will start up in a few days for the summer, there being plenty of ore and water to keep it in operation without stopping. The Mockingbird mill has been closed temporarily, on account of not being able to get the ore packed in rapidly enough to keep the mill in operation. A wagon-road will be built and freight teams employed to transport the ore. Sheriff O'Neill yesterday received a letter from his deputy, J. L. Black, of Flagstaff, saying that another party had just returned from the Grand Canyon with specimens of mineral that were richer than anything previously discovered. The excitement continues greater than ever.

STOCKTON HILL.—Cor. Mohave Times, April 19: In this, and the camps immediately surrounding, mining matters are in an active state and a great many miners are employed, while a good many chlorides report prosperity. At the Night Hawk is employed a larger force than ever before, and this famous producer of rich ore is holding its reputation at the front.

THE BIG BETHEL.—The Mulligans, Tom and Jim, have a veritable bonanza in this claim, situated on the divide between Todd and Union Basins. The ledge is more than 40 feet in width, and will average \$20 per ton across the face, while the tunnel is driven to the hanging-wall and is carrying an 18 to 24 inch streak of sulphurets which, on assaying, will average about 200 ounces silver per ton.

DAKOTA.

RICH ORE.—Deadwood Pioneer, April 18: A strike of exceptionally good fire milling ore was made in the Big Missouri just before shifts changed Saturday night. The day shift broke through the

wall and uncovered rock that fairly glistens with free gold.

FLOAT.—The Golden Reward Mining Co. is working three shifts in its Bald Mountain mines. The property looks exceedingly well.

COLORADO.

LEADVILLE.—Herald-Democrat, April 17: Operations on the southwest side of Carbonate Hill are beginning to extend themselves to a much greater extent than has been the case for a long time. Practically these mines have been shut down for a number of years, but on many of them a considerable amount of work has been projected for the spring opening, and in several instances work has already commenced, notably on the Elina, Carbonate, and Yankee Doodle. The new strike on the former made by Mr. Thompson, at a comparatively shallow depth, is looking much better to-day than when first struck. At the time of our visit some very excellent chloride ore was being hoisted, and a small lot of much better looking dry silicious ore carrying sulphurets was in the bins. At present the pay streak is in the neighborhood of two feet in thickness, though in the northeast drift it seems to be widening. On the Carbonate, just across the line, the Thrall partners will, in all probability, have to sink their shaft deeper in order to fully develop that ground, as the dip is considerable in that direction. On the Yankee Doodle incline some of the men who formerly worked there are doing fairly well, working under tribute to the company, and are now engaged in cutting out the road in order to resume shipments from that point. Some little prospecting is also going on in the old Shamrock incline, though with but little encouragement so far.

LOWER CALIFORNIA.

NUGGETS AND DUST.—San Diegoan, April 16: More nuggets and gold-dust from the Alamo mining district came in this morning by the steam-r from Ensenada. Some of the precious metal as usual found its way to the banks. The First National bought bars worth \$500 and about \$300 worth of loose gold. The California National Bank bought some 15 ounces.

MONTANA.

THE SOUTHERN CROSS.—Anaconda Review, April 17: This mine, as at present developed, shows an immense body of ore of fair grade. The operation of the Cameron mill, however, has not proved quite satisfactory, and the company proposes to erect a large mill near the mine.

CHAMPION.—As the result of its first nine-days' run, the Champion mill has exhibited in Deer Lodge two silver bricks estimated at \$26,000 in value. The ore worked was of low grade and better results are now looked for from the higher grade ore.

THE SILVER CROWN.—In this mine a strike of rich ore is reported. Assays give 134 ounces of silver and \$5 in gold per ton. This mine, with its neighbors, the Champion and the Ruby, promises to give the new town of Champion an enviable reputation.

WILLOW SPRINGS.—Several tons of ore from the Lula mine in Willow Springs district, Jefferson county, have been received at the sampling works in this city for trial. The Ida mine, in the same district, has made a shipment of ore to the Helena smelter for treatment, and other shipments will follow from this property. In the latter mine there is reported to be at the present time not less than \$10,000 worth of ore in sight, and the Ida gives every indication of proving a large and regular ore-producer. Located high up in the Little Belt mountains, near the base of Yogo Baldy, is a large copper-gold bearing lode which is liable to astonish the natives when it is opened up, the working of which will be commenced shortly by the Nelhart company, which owns this and several other mines located in Yogo, Nelhart and Barker districts. The ledge in question is said to be perfectly defined and shows about 60 feet of ore on the surface, assays from which show as high as 65 per cent copper and \$12 in gold. A tunnel will be run to tap the vein at a depth of 250 feet.

IDAHO.

SALE.—Challis Messenger, April 19: The Silver Creek mine, Bayhorse mining district, has been sold by E. E. Dunphy, Bayhorse, to Geo. Newbauer and Erhart Gramp, of the same place, for the sum of \$100,000.

NEW MEXICO.

ZINC MINES SOLD AND BONDED.—Silver City Sentinel, April 17: On Friday last M. W. Neff sold to John Brockman of the Silver City National Bank, the valuable property known as the Neff zinc mine, located in the Hanover district in this county. The consideration is private, but it is believed to be quite large. On the same day Peter Mangall bonded the Mangall & Black zinc mine, also located in the Hanover district, to the same gentleman. This places Mr. Brockman in the possession of all the developed zinc mines in this county. It is understood that in bonding and purchasing these properties he is acting as the agent of a company of Illinois capitalists, who intend to commence active mining and shipping operations at once.

UTAH.

ANOTHER MINING DEAL.—Eureka Chief, April 18: T. P. Murray, the Salt Lake mining broker, secured a lease and bond Friday on Capt. Hugo Deprezin and Pat Donnelly's group of claims adjoining the big Bullion-Beck, Eureka Hill and Blue Rock mines. The claims consist of the Solid Muldoon, Silver Glance, Ontario, Mary L., Belcher, Deprezin Lode, Comstock, Golden Eagle and the Mary L. Millsite. The lease is for six months. Mr. Murray stated to a Chief reporter that he will commence work on these claims at once, with two shifts of men, night and day. Capt. Deprezin is retained as manager.

PROSPECTING has begun in earnest and the mountains and gulches are full of men with burro and pick in search of good-looking croppings. The number is being augmented every day by newcomers who have but recently heard of the wonderful richness of Tintic mining district.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING APRIL 15, 1890.

- 425,734.—SHEAVE.—W. H. Birch, S. F.
425,733.—ORE FEEDER.—C. B. Bingham, Volcano, Cal.
425,740.—AUTOMATIC FIRE-LIGHTER.—H. W. Borchers, Portland, Or.
425,767.—ELECTRIC RAILWAY.—T. A. Evans, S. F.
425,773.—HOSE COUPLING.—Robt. Franken, Pomona, Cal.
425,776.—PACKING FOR STUFFING-BOXES.—Gatchell & French, Oakland, Cal.
425,423.—BUGGY-SEAT PROTECTOR.—J. O. Hamaker, Bonanza, Or.
425,671.—STUMP-PULLER.—Geo. Harvey, Forestville, Cal.
425,675.—COATING METAL PIPES.—J. D. Hooker, Los Angeles, Cal.
425,887.—BASEBALL GLOVE.—G. C. Kohler, S. F.
425,816.—TRAY FOR DRYING FRUIT.—S. A. Moulton, Campbell, Cal.
425,907.—RAILROAD-TRACK LAYING MACHINE.—Geo. Roberts, Eulenburg, Wash.
425,829.—RAILROAD-TRACK LAYING MACHINE.—Geo. Roberts, Tacoma, Wash.
425,831.—VENTILATING OUTLET FOR REFRIGERATORS.—L. Schaffer, Oakland, Cal.

The following brief list by telegraph, for April 23, will appear more complete on receipt of mail advices:

- Calif. mia.—Rosalie V. Baraco, Fresno, closet attachment, Elwood Chaffey, Santa Monica, wave motor; Leo D. Craig, S. F., ore-feeder; Jessie G. Greenlow, Pepperwood, fruit-picking stand; William W. Hitchcock, Los Angeles, key-faster; also hypodermic syringe; William P. King, Los Angeles, floor-tightener; A. Mayer, Pasadena, two for automatic fluid tanks; Alexander McDonald, Franklin, sack fastener; John A. Paton, San Diego, retaining device for overshoe; Silas F. Woodworth, Clippert day, sheet-metal folding machine.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast Inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

MARKER, CUTTER AND POLISHER FOR PLASTIC STONE-WORK.—Eliza K. Smith, S. F. No. 425,110. Dated April 8, 1890. This invention relates to a device for marking, cutting and polishing the surface of artificial stone or concrete, and is especially adapted to laying artificial-stone pavements or sidewalks where the central portion of the stone block is required to be roughened, while a smooth and polished surface surrounds this roughened portion, and grooves or channels are marked in this polished portion, which form the separating lines between the blocks of stone, or in some cases simply for ornamentation. It consists of a metal plate having a surface or surfaces corresponding in width to the portion to be polished, and intermediate projecting ridges which serve to form the marks or divisions on the surface of the stone. So great is the advantage of having the implement with two or more projecting ridges and the polishing surfaces between them combined together, that it is claimed a workman will lay fully one-third more pavement (everything else being equal) with such an implement than he can lay with an equal amount of time and labor if he uses implements which contain but one of the projecting ridges for making the depressions and smooth spaces mentioned.

SPRINKLER.—Joseph Oswald, S. F., assignor to Harris, Oswald & Noble. No. 425,340. Dated April 8, 1890. In the manufacture of lawn-sprinklers of that class having a vertical standard and a rotary head with arms, upon one side of which jet-holes are made for the escape of the water, so as to give the sleeve a centrifugal rotary motion, various methods have been employed to provide an easily running head, and at the same time to prevent or compensate for wear which may take place. This improvement in lawn-sprinklers consists essentially of a hollow standard through which water is conveyed, a slightly tapering or inverted conical head fitted to the upper end of said standard, the upper and larger end terminating in a shoulder against which a correspondingly shaped sleeve abuts, said sleeve carrying the arms by which centrifugal rotation is produced, and being held in place by a nut which screws upon the lower part of the head and by which adjustment may be made. By means of this nut the sleeve may be raised or depressed so as to change its fit upon the head. A close joint may always be kept.

PACKING FOR STUFFING BOXES.—W. S. Getobell, San Jose, and Robert E. French, Oakland. No. 425,776. Dated April 15, 1890. This invention relates to that class of packing for stuffing-boxes of all kinds in which contractible metal rings are employed and from which the usual term of "metal packing" is derived. In this invention the rings and parts are compressed between a gland on one side and a spring on the other so that the tighter the gland is set up the greater the compression of the several parts. The contractible rings are compressed between the conical seats in which they fit, and this compression upon their periphery causes them to contract and thereby

bind perfectly upon the working rod. There is no need of any enrolling elastic or compressible material or band to cause the metallic rings to contract on the rod, as their conical seats effect this purpose with absolute accuracy.

REVERSIBLE WINDOW-SASH.—Ernest L. Requin, Sacramento, and Thos. J. Kingston, S. F. No. 425,146. Dated April 8, 1890. This invention relates to that class of window-sashes which are pivoted by their stiles to the casing, whereby they are adapted to be reversed in order to allow the outside of the glass to be reached and cleaned with convenience. The invention consists in the novel construction and arrangement of the sash-frame, the means for turning the sash and locking it in position when turned, the means for tightening it, and other details of construction.

TRAY FOR DRYING FRUIT.—S. A. Monilton, Campbell, Santa Clara Co. Dated April 15, 1890. The points of novelty lie in the hearing pieces and the end pieces which are so arranged that when the trays are piled, free ventilation is provided for the entire tray-pile in all directions. The hearing pieces raise the tray bottoms off the ground so that when the trays are severally taken up to pile them, no dirt or gravel clings to them or falls in the other trays.

SHEAVE.—Wm. H. Birch, S. F., assignor of one-half to Charles J. Kaighin. No. 425,734. Dated April 15, 1890. The object of this invention is to provide a sheave having a separable or detachable easily renewable wearing-surface, whereby the body of the sheave may be preserved indefinitely. Though this improved sheave may be used in any place or connection, it is especially of value in the construction and maintenance of cable roads, being adapted for use in the tension-carriage, at all places where a change in the direction of the rope is bad, at the terminus of the road where the rope returns, and wherever there is particular wear and strain on the cable. In these and similar places the sheaves always wear out on their rims, and they then have to be entirely renewed—a difficult and expensive proceeding—and in the operation of cable roads a delay is caused, the effect of which is to tie up the entire road. This invention avoids this necessity, and also gives other advantages.

ORE FEEDER.—Cullen B. Bingham, Volcano, Amador county. Dated April 15, 1890.

This is a device for feeding ore to quartz-mills or other crushing machinery. The ore flows from a hopper into a horizontally inclined rotating cylinder, and the angle of the cylinder may be changed so as to make it feed fast or slow as desired. At the front of the cylinder is fixed a scraper which extends along in contact with the upper interior and of the scraper so that wet or sticky ore will not clog the machine.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, department 10, San Francisco:

DIRIGO M. CO., April 5. Location, Nevada. Capital stock, \$1,000,000. Directors—A. V. Oliver, Carl Davis, W. H. Cone, Ed Dexter and S. A. Fisher.

ANTELOPE RANCH CO., April 5. Object, to deal in lands and construct irrigation ditches. Directors—J. F. Turner, H. Oterson, A. J. Robinson, C. P. Rixford, A. J. Sanborn, J. W. Wesson and A. E. Bolton.

PACIFIC ROLL PAPER CO., April 5. Capital stock, \$100,000. Directors—Smith Bartlett, F. W. Ainsworth, T. J. Corwin, Bartholomew Noyes.

CALIFORNIA CAMERA CLUB, April 6. Object, social and educational. Directors—George W. Reed, Clarence J. Wetmore, Sanford Robinson, A. P. Flaglor, Thomas P. Andrews, William N. McCauley, E. J. Molera, E. P. Gray, Thomas C. Norcan, Howard C. Tibbitts and I. E. Thayer.

CALIFORNIA FUEL CO., April 7. Object, to buy, sell and manufacture all kinds of fuel. Directors—C. C. Cashberg, G. H. Swasey, E. K. Taylor, T. J. Janes and C. S. Swasey.

CALAVERAS BIG TREES CO. Object, to operate and sell lands and water rights; also to erect and carry on hotels, stores, livery stables and all other business pertaining to hotel-keeping. Directors—James L. Sperry, William Crocker, James W. Sperry, Evans F. Pillsbury and Frederick J. Huse.

HERCULES G. M. CO., April 8. Location, Meadow Lake, Nevada Co. Capital stock, \$1,500,000. Directors—John P. Clark, Frank J. Cook, J. C. Spellingberg, J. H. Knuthson and John Hayes, all of Sierra City.

CITRUS FRUIT CO., April 9. Location, Placer Co. Capital stock, \$500,000. Directors—Charles S. Wheeler, D. H. Porter, A. G. Freeman, E. K. Baxter and W. C. Stoud.

BLUE LAKES WATER CO., April 9 (Oakland). Capital stock, \$100,000. Object, to bring water from the Blue Lakes, Alpine Co., Cal., to the city of Oakland. Directors—H. D. Bacon, Daniel E. Hayes, V. D. Moody, R. M. Kirkham, F. K. Shattuck, A. T. Hatch, T. G. Phelps of Belmont, Thomas Bell, S. A. Marshall, J. W. Smith and J. S. Emery.

The Colorado River Placer M. Co. has filed a notice of the removal of its principal place of business from the city of Colton, San Bernardino county, to this city.

KLAMATH PACKING AND TRADING CO., April 11. Capital stock, \$100,000. Directors—C. C. Rohlf, F. Gee, Jay Deming, A. F. Johns and John Bamhoff.

BEDBURY BALANCE SLIDE VALVE CO., April 10. Object, to manufacture and sell a balance slide valve. Capital stock, \$1,000,000. Directors—George W. Badbury, H. D. Wallace, Henry H. Clement, E. F. Badgley, Robert Brand, J. C. Brown and W. M. Cannon.

MECHANICAL PROGRESS

Blacksmiths and Their Calling.

Blacksmiths and other iron-workers should be very proud of their calling. Gold has been called the most precious of metals, and so admitted; but as between gold and iron, the world could better dispense with the yellow metal than with iron. Of course we could exist without either; but to be without iron would carry us back centuries and paralyze thousands upon thousands of industries, and take away nearly all the great inventions of modern civilization. This can readily be comprehended when once attention is called to the fact.

The antiquity of iron is an unsettled question, but we have mention of it in the earliest records, and from all times the workers in iron have been held in high esteem, and oftentimes considered chief among the many. The Greeks had their Vulcan and the Hebrews their Tnal Cain. Even in the wilds of Africa, Dr. Livingston discovered workers in iron, and the novel method they had of working it was surprising. The modern forge is an improvement over the bellows, but the latter, of course, should not be mentioned in the same breath with the rude contrivance of the Africans—an earthen forge, covered with two blow-pipes, acting without any tuyeres, but attached to two upright boxes or valves. In these valves the operator places pistons, which he works up and down alternately with either hand, and thus forces a continuous blast. It is a rude but ingenious, and works reasonably well. A stone near by answers the purpose of an anvil. In early times the glory of the iron-worker lay in the fact that he was the maker of swords, spears and other implements of war. War was the principal occupation of people then; might was right, and war to the captives.

Now the scene is changed. The world is peaceful. Agriculture, commerce and the mechanical arts furnish the chief sources of livelihood, and in all these the iron-worker lends a helping hand. The farmer's implements are made by the iron-worker, his horses are shod (occasionally) by the iron-worker; the wheels of commerce are accelerated by his efforts. Without him, it would be the slow ox team of yore, while he almost, if not actually, personifies machinery. Verily, the legend attributing to the iron-worker the seat at the right of King Solomon, at the dedication of the great temple, is but further proof of that wise monarch's wonderful wisdom.—*Blacksmith & Millwright.*

TEMPERED COPPER BOXES AND BEARINGS.—Copper is well known to be the basis of nearly all anti-friction metals. It, however, lacks the strength in its natural state for bearings, and must be hardened by amalgamating with tin and other metals, to give it the required strength and hardness. Such mixtures change the whole nature of the copper, leaving it a granular and brittle metal with a hard grinding surface, instead of a tough, fibrous metal. That copper was hardened or tempered by the ancients no one can doubt, as samples of edged tools and relics of all kinds have been found, composed of pure copper, and are on exhibition in all collections. It is said that the Eureka Tempered Copper Co. of Northeast, Pa., has discovered this process, and is able to supply the trade with any and all kinds of copper cast solid, tempered to any gauge that the work expected of them demands. Among the uses to which tempered copper can be put are: Locomotive and railroad bearings, engine-boxes (high or low speed), gears, pinions, gibs, rolling-mill boxes, mill steps, springs of all kinds, roll plate for boiler plates, all kinds of journal hearings, loose pulleys, friction clutches, carriage axles and boxes, street-car boxes, steam pumps and valves, pump linings, rider brasses, commutator strips or bars, electric brushes, dynamo shells, bearing-boxes for electric motors and dynamos, trolley-wheels, electric switches or contacts.

TESTING CAR AXLES.—The most efficient test of car axles ever made at the United States Rolling Stock Works has recently been completed. Of the axles tested, only one broke, and that was put under a drop of five feet and given 25 blows. The first one tested was given five strokes from the ponderous hammer. Three of these strokes were a deflection of ten feet, and the other two 15 feet. There was no fracture. The second was subjected to seven blows, three of which were 10 feet and four 15 in deflection. There was no deflection. The third stood three blows at 10 feet and 22 blows at 15 feet. It broke under the 25th blow. The fourth stood three 10-foot strokes and five blows at 15 feet without a fracture. The fifth was given three strokes at 10 feet and two at 15 feet without a fracture. The test was made by the inspector of the Savannah, Florida & Western railroad, and the axle was pronounced by him to be the best and strongest he ever passed upon.

COKE AND WHITWASH IN STEEL-MAKING.—The Carbon Iron Works, according to the *Engineering and Mining Journal*, are revolutionizing the trade, in one direction at least. For a year past the company has been making steel by the direct process. Rhode Island graphite was formerly used to absorb the impurities of the iron ore. The graphite was a success, but the freight on it amounted to a considerable

figure, and the company looked around for something with which to replace it. They experimented with coke, and soon found that it would answer all purposes when treated with whitewash. When coke was broken into small pieces and soaked in whitewash, all the impurities of the ore were freed, the oxygen of the iron joined with the carbon of the coke passing off as carbonic acid gas, leaving the impurities in such a shape that they could be easily eliminated. By this means the blast furnaces are doing away with the graphite and a great deal of expense avoided. The coke has now been in use for over a year, and as a result the carbon works are turning out some of the finest bridge plates made in the United States, and steel is produced which is very low in phosphorus.

THE PLATE GLASS BUSINESS appears to have been a rapidly growing industry in this country ever since its first inception but a few years ago, and as is the case with nearly every other branch of mechanical or manufacturing business newly established here and having to compete with the cheap labor of other countries, with little or no protection, its permanent success is only made possible by improved machinery or processes by which the cost here is made less than by the old-time methods employed abroad. As an instance, a dispatch from Zanesville, Ohio, relates that parties in an Eastern State propose to set up a plate-glass plant in that city. "They are glass-workers, and claim to have invented a method which they assert will cheapen the process by one-half. Instead of having the glass full of waves when first rolled out, as with the iron rollers under the old process, the glass is cast perfectly smooth, and almost as polished as the old plate glass after the latter has been polished by special machinery for 14 hours. The 12 hours' grinding and the wasting of from one-half to two-thirds of the material in order to get a plane, level surface is also avoided. It is said that the new plate-glass company at Washington, Pa., is trying to secure the method for use for the plant which is to be erected there. The parties owning the plant say that a plant covering two acres will have a capacity twice as great as the plant in which the men are now employed, which covers six acres."

COMPRESSED POLISHED SHAFTS.—An article has been made in Germany for about two years which has attracted great attention in industrial circles; we refer to the compressed polished shafts. The valuable qualities of these shafts, it is thought, will assure their speedy introduction and general adoption. These shafts, which can be welded and tempered, possess a torsion strength more than double that of turned or rolled shafts. They are made of pure, soft Siemens-Martin steel containing from 20 to 25 per cent of carbon. It is the carbon that causes the shafts to have a tenacity of 50 per cent greater than ordinary shafts, and while possessing seven-tenths the diameter and half the weight of the latter, they afford equal security. They are perfectly round and straight, are exact in caliber, and do not need turning. From a number of experiments made by Messrs. David Kirkaldy & Son of London, it was shown that their limit of elasticity was 79,200 pounds (English), that of ordinary iron being 23,800 pounds, and of patent rolled shafts 60,600 pounds. The relative strength is, iron, 1000 pounds; patent rolled shafts, 1505 pounds; compressed polished shafts, 1601 pounds. This compressed material can be used for a variety of purposes, as pulleys, guide-rods, piston-rods, pump-rods, slide bars, etc., axles, spindles, bolts, in agricultural implements, printing, weaving, spinning, sewing, washing machines, etc.; in short, wherever drawn or turned material is now used.

SCREWS.—It is not known when screws were first made and brought into use. The first instance known of machinery being applied to the making of screws was in France in 1569, by a man named Besson, who contrived a screw-cutting gauge to be used in a lathe. The early method had been to make the heads by pressing the blanks while red-hot between dies, and then to form the threads by the process of filing. In 1741, Besson's device was improved by Hindley, a watchmaker of York; and for a long time the watchmakers of England employed the latter's method in making the small screws used in their work. The first English patent appears to have been issued to Job and William Wyatt, in 1760, for three machines, one for making blanks, another for making the heads, and a third for cutting the threads. Between that date and 1840 about ten patents were issued, only one of which is worthy of notice, namely, that of Miles Barry, dated Jan. 28, 1837, which was for a gimlet-pointed screw.—*Builder and Woodworker.*

PETROLEUM MOTORS are being simplified and improved to such an extent, says an English journal, that they may now be ranked among the useful small motors. In one manufactured at Berlin, ordinary lamp petroleum is used with success, and a number of these little engines, varying from one to four-horse power, have been running for over a year in different parts of Germany and Russia; while in Belgium, a company for their construction has been formed, and the works (situated in Brussels) are in full swing.

THE DEMAND FOR LOCOMOTIVE ENGINES at present exceeds the supply, and this has been the condition for some time.

SCIENTIFIC PROGRESS.

The Sound of Light.

Experiments have long since proved that light exerts a projectile or pushing force; and more recently it has been shown that a beam of light may also, under certain conditions, produce sound. A beam of sunlight is thrown through a lens on a glass vessel that contains lamphack, colored silk or worsted, or other substances. A disk having slits or openings cut in it is made to revolve swiftly in this beam of light, so as to cut it up, thus making alternate flashes of light and shadow. On putting the ear to the glass vessel, strange sounds are heard so long as the flashing beam is falling on the vessel.

Recently a more wonderful discovery has been made. A beam of sunlight is made to pass through a prism, so as to produce what is called the solar spectrum or rainbow. This disk is turned, and the colored light of the rainbow is made to break through it. Now place the ear to the vessel containing the silk, wool, or other material. As the colored lights of the spectrum fall upon it, sounds will be given by different parts of the spectrum and there will be silence in other parts.

For instance, if the vessel contains red worsted, and the green light flashes upon it, loud sounds will be given. Only feeble sounds will be heard when the red and blue parts of the rainbow fall upon the vessel, and other colors make no sound at all. Green silk gives sound best in red light. Every kind of material gives more or less sound in different colors, and utters no sound in others. The discovery is a strange one, and it is thought more wonderful things will come of it.

THE NEW MATERIAL FOR CLOTH.—A detailed description has appeared of Mitchell's most interesting process for producing cloth from wood. Thin boards or laths, free from knots, are cut into strips in the direction parallel with the grain, and are holed in a solution of sulphurous acid or bisulphite, this hoiling effecting disintegration without the strips being reduced to very small pieces. The wood, after hoiling, is dried in the open air, and when dried the fiber becomes comparatively strong. The damp masses on the frame are transferred to a traveling endless cloth, which leads them to a pair of rollers, which may be plain or provided with corrugations in the direction of their length, the ribs of the one roller being made to gear into the recesses of the other one, whereby they effect a simultaneous strong bending and squeezing of the masses. The cutting of the material in passing through the rollers is avoided by causing the endless cloth to pass over the lower roller, and by placing a canvas covering around the upper roller. The pressed masses fall from these rollers on to a second endless cloth which conveys them to a second pair of rollers, from which they are conveyed to a third pair—and so on, for six times. By continued treatment of the wood the fibers become at length so pliable and isolated from each other that they can be employed directly for coarse filaments; but to obtain a long fiber, the hoiled and pressed masses are completely dried, then combed in the direction parallel with the fibers, similarly to the operations for combing flax, cotton, etc. The separation of the extractable matter from the fiber produced by boiling the gums and soluble organic matter can be effected at any time, though it is preferable that this be effected after the fiber has been spun into threads, etc.

THE NATURE OF GRAVITATION.—Some one asks the *Manufacturer and Builder* what the opinion of the scientists of the present day is in regard to the "real nature of gravitation." That paper in reply says: "The 'real nature of gravitation' is as much of a mystery to-day as it was to the philosophers of Newton's time. This philosopher succeeded in establishing, by mathematical reasoning (proceeding upon the observed motions of the heavenly bodies), the fact that they mutually attracted one another according to a definite law which he formulated, and which has since been known and accepted as the law of universal gravitation. To explain the mutual action of bodies at a distance as great as that which separates the celestial bodies, without the intervention of some medium by which the force may be conveyed from one to the other, seemed to Newton inconceivable; and the impossibility of conceiving the transmission of actions in an absolute vacuum has caused the universal acceptance by philosophers of an ethereal medium distributed throughout all space, and existing within material bodies; and all the phenomena, by means of which we are made conscious of the external world, are supposed to be produced by various affections of the ether. We know not if gravitation is a pushing or a pulling force, as our inquirer crudely puts it. On one hypothesis it is assumed to be due 'to the impact of ultramundane corpuscles,' which would make it a 'pushing' force. We commend to this inquirer the reading of the article on 'Attraction' in the *Encyclopedia Britannica*, which is a very good resume of the subject."

MAGNETIC PHENOMENA.—In a recent lecture by Mr. Shelford Bidwell before the Royal Institution of London on Magnetic Phenomena, that gentleman, after some introductory re-

marks on the nature of magnetism phenomena and on Faraday's conception of "lines of magnetic force," called attention to a very delicate reflecting magnetometer, consisting of a small magnet attached to a suspended mirror, the deflections of which were made visible to the audience by means of a lamp and scale, in the usual manner. He then proceeded to show that various small iron objects, such as a pocket knife, a nail and a door key, none of which had been intentionally magnetized, nevertheless exhibited traces of magnetism. The well-known experiment, illustrating the earth's power of magnetic induction, consisting in holding a bar of soft iron in a vertical position and observing its polarity, then inverting it and tapping it, on which its polarity is reversed, was very well shown by the magnetometer, a very light tap being sufficient for the purpose. A soft-iron bar, which had previously been deprived of its magnetism by raising it to a yellow heat and allowing it to cool in an east and west direction, and therefore with its length perpendicular to the earth's line of force, was then moved parallel to itself into the neighborhood of the magnetometer without producing any sensible effect; but a deflection was immediately visible when the bar was turned into a vertical position, the direction of the deflection showing that the lower end had become a north pole.

PRIMITIVE METHODS OF MAKING FIRE.—It has been discovered by Dr. Adler of Johns Hopkins University that the Acaadian fire-god was represented by crossed sticks in the position in which they are held when fire is being made. As the records of these people are among the very oldest known, the method of making fire by twirling one stick on another may be regarded as the most primitive. The spark struck from two pieces of flint will not ignite tinder. In order to get fire by the use of a flint it is necessary that a piece of pyrites, iron or steel be used. As no one has ever found a piece of flint together with a piece of pyrites, it is safe to say that the Indians knew nothing of this method of making a fire.

CAMPOR AND NAPHTHALINE.—The advanced and advancing price of camphor, druggists state, will result in greatly increasing the demand for naphthalene. This is a comparatively new product of petroleum, and is a powerful disinfectant and effective protection against moths and kindred insects, and with camphor likely to reach 60 cents a pound and perhaps \$1, as many venture to predict, an active demand for it is anticipated. It is so new that it has not come into general use as yet, though a steadily growing demand for it is noted; but for camphor in many of its uses there is no satisfactory substitute, and no weakening in the market is regarded as likely for an indefinite time.

SMOKELESS POWDER RENDERED USELESS.—When the announcement was made that smokeless powder was a success, there was great exultation among military men, as it was thought that it would be possible to watch the maneuvers of an army and command them to much better advantage. A French genius now comes forward with an invention which knocks the smokeless powder into the shade. It is a smoke bomb which is capable of creating vast clouds of smoke and can be fired into the ranks of an enemy who uses the smokeless powder, obscuring his view and placing him at the same disadvantage as if he used the old-fashioned powder.

THE MOON AND THE MAGNETIC NEEDLE.—An Australian meteorologist claims to have ascertained by careful investigation that the moon has an influence on a magnetic needle, varying with its phases and its declination. The phenomenon is said to be more prominently noticeable when the moon is near the earth, and to be very marked at those periods when she is passing from the full to her first and second quarter. It also appears that the disturbances in question are at their maximum at the time when the moon is in the plane of the equator.

EARTH-SHINE OR ASH LIME.—The pale, delicate light, which renders visible the unilluminated portion of the moon's disk is called the "earth-shine" or "ash lime." It is caused by the reflection of the sunlight upon earth to the moon, from which body it is reflected back to the earth, and is most conspicuous when the unilluminated portion of the moon is smallest, as about the time of the full moon.

WASTE AND DAMAGE IN THE USE OF COAL.—Tests made in London have shown that the value of coal wasted in smoke from the domestic fireplaces in that city amounts to \$11,282,500 annually, while the aggregate waste of unconsumed carbon is \$13,000,000 a year, and the damage to property caused by smoky atmosphere is put down at \$10,000,000.

A NOVEL TELEPHONE.—Invented by an American, has for its primary feature the transmission of sound by the vibration of glass. From a glass diaphragm extend a number of glass tubes of various sizes communicating with an ordinary wire. Very clear and distinct utterance has been found to result on trials over a line three miles long.

UNVENTILATED CARS.—W. R. Nichols, a well-known chemist of Boston, says he has found twice as much deadly carbonic acid gas in the air of an unventilated passenger car as in one of the main sewers of the city of Boston.

GOOD HEALTH.

Health of the State.

The March issue of the circular of the State Board of Health gives reports from 101 localities representing a population of 855,000, of which 1189 deaths have occurred, and a rate of mortality of 10.56 per thousand. An important decrease from the February report. Diseases from the respiratory organs continue to add to their quota to the bill of mortality.

The reports do not indicate much subsidence of the diseases of the respiratory organs so prevalent in January and February. Pneumonia, bronchitis, congestion of the lungs and influenza were reported in almost every locality heard from. Influenza is, however, subsiding, and no longer partakes of the epidemic form. The health officer in Trinity county reports the death of 4 Chinamen from "La Grippe," which is a remarkable circumstance, as the Chinese, as a rule, do not seem to be as susceptible to the disease as the white people. It must, however, be recollected that the accuracy of Chinese statements as to the nature of disease is very liable to error.

The precautions now quite generally taken to isolate patients afflicted with diphtheria and croup appear to be effective in preventing the spread of the infection, as no reports are received of these diseases being epidemic.

Important Health Considerations.

Typhoid fever is noted in some localities; but it is not as prevalent as it will be when the ground begins to dry after the excessive rains of the past season. This is accounted for from the fact that: "The occurrence of unusual amounts of rain supersaturating the earth disturbs the contents of privies and cesspools, causing the carriage from these receptacles to be deposited in new localities and perhaps at far distant points. Now, supposing any of the contents of these privies and cesspools contained the germs of typhoid fever, their deposition on the ground and subsequent desiccation or carriage into our water supply might be the cause of a serious epidemic. We know, at all events, that the putrefaction of organic matter is inimical to health, and the debris left after the subsidence of large accumulations of water should be removed from around our dwellings, our out-houses, our alleys and our streets, carried away and buried deep or burned. The cleansing of our premises is now a wise precaution against future sickness, and as typhoid fever is peculiarly a filth disease, its mode of prevention is essentially cleanliness."

"The typhoid germ can be swallowed in food as well as drunk in water. Prof. Vaughan of the Michigan University discovered the bacillus in sewer air, and Dr. Baker, the eminent Secretary of the State Board of Health of Michigan, contracted the disease. It is supposed, from the air of this very same sewer. Our health officers are therefore requested to urge upon their several districts the extreme necessity that exists at this time to remove all accumulations of debris and filth from about their habitations, as what are now comparatively harmless deposits will, in the presence of increasing temperature, become masses of putrescent and dangerous organic matter, that is certain to deteriorate the health and infallibly expose the system to a condition favorable to the receptivity of disease germs and their successful cultivation in the soil thus prepared for their accommodation and development. It is only by the education of the public to these dangers that we can hope to avoid them, and to the health officers the public look for such information, and for such safeguards to its health which their education in sanitation particularly enables them to supply and direct."

Cancer.

The terrible malady of cancer is credited with 41 deaths during the month. If some one or more of the more progressive and humane members of the faculty would lay aside their cherished ethics for a time, and make some honest inquiry into what is being done in this city in the private treatment of this disease, they would not only be astonished at what they can be shown, but would start a movement which would eventually save thousands monthly in this country, alone, from death by one of the most terrible maladies with which humanity is afflicted. A few hours of preliminary observation would be sufficient to so interest any really sincere investigator that he would be willing to take whatever further time would be necessary for the most thorough investigation of the whole matter.

Antiseptic Value of Eucalyptus.

Writing to the Selma Irrigator about *eucalyptus globulus*, W. A. Sanders says:

In soaking up old wine or vinegar casks, we throw a few blue-gum boughs with their leaves into the water, and it never becomes putrid, while without the blue-gum we would have to change the water daily to prevent putridity and spoiling of the flavor of anything afterward kept in the cask.

We have kept fresh beer eight days in the hottest weather by keeping around it a plentiful supply of green blue-gum leaves and changing them daily.

A decoction of green leaves is a stronger and more lasting stimulant than tea or coffee, and more salutary in its effects, as it does not cause

wakefulness. It seems to have the stimulating effect of quinine without any of its injurious qualities.

CANINE CURE FOR RHEUMATISM.—The Wheatland Four Corners avers that a certain Grass Valley man has slept with a dog in his bed every night for the last 20 years. He claims that a dog in bed with a person will draw the rheumatism out of the person into its own body. He says he has used up three dogs in that period, they having become prostrated with the disease contracted from his chronic ailment.

USEFUL INFORMATION.

OSCILLATIONS OF HIGH CHIMNEYS.—A French journal gives some particulars of the oscillation of a chimney-stack near Marseilles, 115 feet high, with an exterior diameter at the top of four feet. During a severe storm it was determined, by observing the shadow of the chimney, that its greatest oscillation was nearly one foot eight inches. It was further observed that a chimney set in motion by a gust of wind oscillates from four to five times backward and forward until it is at rest again. M. E. Barg asserts that should this momentum during the oscillations of a chimney repeat itself in such a manner that its direction coincides with that of oscillation, the overthrow of the chimney may be expected. This is the explanation given for the destruction of many a chimney constructed in accordance with sound principles of stability. In the case of a chimney near Vienna, 164 feet high, and constructed of concentric hollow rings, with an inner diameter to the top of 6½ feet, which is exposed to considerable gusts of wind, the oscillations were most carefully and repeatedly measured with a theodolite, when the observations showed an extreme oscillation of only 16 centimeters (16½ inches) during severe storms.

A NOTABLE FACT in connection with a public manual training school in Philadelphia, as reported in a local paper, is that of the boys now in the training school and learning the use of chisels and hammers and lathes, fully three-fourths are the sons of professional and business men—many sons of doctors and ministers and lawyers. Of the 77 occupations recorded of parents of boys now in the middle class, 34 are those of professional or business men and 23 those of men engaged in other pursuits, of whom only 14 are artisans. On the other hand, it is stated that children of mechanics in that city are "striving to get into the ranks of the struggling and poorly paid professions." Well, it wouldn't do for all to be mechanics; and nine times out of ten the workman's son becomes the most successful lawyer, doctor or clergyman. His self-reliance and ambition generally overcome all obstacles.

A NEW MINERAL OIL which will be known as "dynamine," having the consistency of butter, has recently been introduced to the manufacturing public by La Compagnie Française des Graisses Minérales Consistantes. The new substance is not acid, and is free from resinous matter and drying oils. It is very stable in character, and does not undergo any change when exposed to the air. Its buttery consistency does not appear to be due to the addition of paraffine, vaseline or wax to a liquid oil, as it has a definite melting point at 84° C., and does not inflame at a temperature lower than 220°. In color it resembles butter, and it has no appreciable odor. These properties give it an especial value as a lubricator, and as it has no chemical action on metals, dynamine is likely to be extensively used for this purpose.

LEATHER FROM WOOD.—It is said that one Dr. George Tenius of Vienna has a process for the manufacture of artificial leather from red beechwood. The best wood for the purpose is taken from 50 to 60-year-old trees, cut in the spring, which must be worked up immediately, bark peeled off, steamed, treated with chemicals in a kettle under pressure, and exposed to several more operations which the inventor does not mention, as he wants to have them patented. From the prepared wood, strong and thin pieces are made by means of pressure. The inventor states that solid sole-leather can be obtained, which he claims is superior to the animal leather in firmness and durability, and can be worked up in the same way as animal leather, nailed and sewed.—*The Tradesman*.

VARNISH FOR COPPER WORK.—In varnishing new copper work, use hotted linseed oil; it stands the weather as well as the best coach varnish, although it does not make so smooth a surface, and is much cheaper. Two coats are sufficient; let the first coat dry thoroughly before the second is applied.

A USE FOR THE PHONOGRAPH.—For political, religious and reform purposes, it is proposed that, instead of sending speakers to all parts of a State, to provide phonographs loaded with appropriate addresses, send them from one point to another, and turn them loose at every public gathering.

BRICK FROM SLATE.—Northern manufacturers are interested in the statement that the finest brick made in the South are from the refuse of slate quarries. They have a double resisting power and absorb only one-third as much water as ordinary brick.

ENGINEERING NOTES.

RUSSIAN ENTERPRISE.—It seems probable that the Russian Government will shortly begin the construction of the great canal between the Onega lake and the White sea, connecting that sea with the Baltic, plans for which have been for some time under consideration. It is estimated that the length will be 235 kilometers, of which 138 kilometers are natural canal, while the depth is to be three meters. The cost of the canal alone is estimated at seven and a half million roubles; but with a harbor constructed at Wyg, on the White sea, and dredging of the river Svir, the cost will be ten million roubles. In regard to the Siberian railroad, the statement has been made that the Rothschilds have relinquished that enterprise by refusing the loan of two hundred and twenty millions asked from them. The Rothschilds are not now the only money kings in the world. If Russia finds it for her interest either pecuniarily or as a war measure to build that road, the Rothschilds will not be able to prevent its construction by simply refusing to furnish the means. There is scarcely a doubt but that the road will be completed at an early day. It will open up to commerce one of the finest sections of country in the world, and with its active operation the present disturbing question of excessive cruelty in connection with Siberian exile would soon come to an end.

THE BRIDGE ACROSS THE BOSPHORUS.—It is reported that a French syndicate proposes to build a bridge across the Bosphorus. It is thought that the bridge, by linking the Asiatic and European railway systems, would be sufficiently useful to justify the enormous expense which it would entail, and would eventually pay for itself. The French engineers who are ready to undertake the construction have fixed upon Roumeli Hissar as the point from which the bridge would start, the distance thence to Anadol Hissar being 2624 feet. It is understood that it is proposed to make the bridge with one span only. The longest bridge span at present is 1710 feet. If the Bosphorus should be crossed by a single span of 2624 feet that would be considerably less than the present proposed span across the Tagus at Lisbon, which exceeds 3000 feet in length. There appears to be no limit to modern engineering.

WAVE-POWER.—The force exerted by waves beating on the seashore can be averaged. It has been ascertained that a rolling wave, 20 feet high, will exert a force of about one ton per square foot. The action of waves is most destructive at low-water line, while the extreme height of mid-ocean waves is estimated to be from 20 to 22 feet. The average force of ocean waves has been estimated to be 611 pounds per square foot during summer and 2086 pounds during the winter months. During a heavy gale a force of 6983 pounds was ascertained. Such a wave-power machine was in partial operation some years ago on the ocean beach, beyond the Cliff House, but the inventor neglected to provide for the extra energy developed in the waves by rough weather, and the motor was wrecked.

THE GREAT COLORADO TUNNEL, which has been for 10 or 15 years in slow process of construction under the auspices of "Brick" Pomerooy, through the Rocky mountains, has a prospect of being at length completed and employed for railroad purposes. This tunnel is located 60 miles due west from Denver. It will shorten railway distance 250 miles between Denver and Salt Lake City. More than 4600 persons are now financially interested in the enterprise. The tunnel will be five miles long and 4400 feet below the top of Gray's peak. The company enters the year 1890 entirely free from floating debt, all its bills paid and work going ahead day and night in both ends of the tunnel. By the use of modern machinery from six to ten feet headway is gained every day.

ENGINEERING EXTRAORDINARY.—Recently, by accident, the New York end of the Hudson River tunnel was seriously flooded, and all ordinary methods of stopping the leaks proved unavailing. At last Engineer Moy contrived a novel means of finding the holes. On Thursday he secured a number of water rats, tied long pieces of oakum to their tails, caught in the middle by a piece of wire. The rats were then forced into the caisson through the air pumps. The rats, following the current of air, found the leaks, and, passing through the crevices, left the oakum behind. This stopped the ingress of air sufficiently to enable the pumping to proceed with success.

A NEEDED WORK.—The Government appears to have under serious consideration a proposition to construct a canal around Niagara Falls to accommodate American lake shipping and war vessels in case of an emergency. According to the plans under consideration, it will cost \$23,000,000 and will have a depth of 20½ feet. The necessity of such a canal, it is argued, is made apparent by Canadian discrimination against vessels of the United States passing through the Welland canal.

THE LONGEST BRIDGE IN THE WORLD, if built according to present estimates, will be constructed by the Roumanian Government across the Danube between Dadesci and Tohervavoda, thus effecting a junction between

Hustenega harbor and the Western railway of Roumania, which already runs as far as Dadesci. As there is a large tract of marshy ground on the left bank of the Danube where the bridge will be built, this will have to be no less than 20 miles in length.

ELECTRICITY.

Steam and Electricity—Partners.

Steam and electricity instead of being rivals are partners. The statistics of steam engines show a greater demand than ever before, while, at the same time, the electrical field has known an extraordinary development.

Early in the electrical era the enthusiast declared that his favorite force would usurp the place of steam, to which the steam men replied that they'd wait and see.

They have waited, and what they have seen is something quite different from what they had been led to expect by the prophecies of overanguine electricians. The more electric light and power developed, the greater has been the demand for steam. For though, in isolated and widely separated instances, electrical generators are turned by water-power, steam is almost universally employed; at least, as yet, is indeed the only certain and expeditious mode of performing the service.

And so it is; you may follow the wire from the light, trace the main to the source where it gets its energy, and there you will find—the steam engine.

The effect of the coming of electricity as a motive force into the field occupied by steam finds a striking parallel in the effect of electricity, as an illuminant, upon gas.

When Edison announced his discovery of a means of subdividing the electrical current, the gas men trembled, for it was known he was no idle hoaster. The answer came next morning from London that gas stock had declined \$1,200,000 (\$6,000,000) at the news.

Everybody would, of course, prefer electric lighting to gas, there would be no demand for this product of coal, and the gas companies would collapse or go into the hands of receivers.

So it was thought.

What really happened was a surprise to every one.

Wherever the electric light came into use the demand for gas increased.

People became used to an intense light. Shops with two gas jets aglow in their windows appeared dingy in the neighborhood of a big voltaic arc light, so the keepers turned on four jets. Those with five turned on ten, and so on.

And so it was that the gas people who once looked forward to electric illumination with fear and trembling came to regard it with equanimity if not with positive friendliness.

In the matter of power distribution the case is not essentially different. What were formerly small steam-users, are more and more inclining to the use of electricity; getting their power from a motor energized by wire from electrical-power vendors. But, as a set-off to this, there is an enormous demand from one end of the land to the other for powerful steam engines to drive electric-lighting dynamos.

Before the advent of electric lighting there was, of course, no such demand; the gas companies attending to all the lighting without the interposition of steam engines at all.

Engine-makers are, therefore, indebted to electricity. It is a benefactor rather than an enemy, a partner rather than a rival.—*The Safety Valve*.

GROWING DEMAND FOR ELECTRIC MOTORS.—The uses of the electric motor are multiplying daily, and one of the indications that its adaptability is recognized by the public is that machines for both constant potential and constant current systems have been manufactured during the past year at the rate of upward of 250 per week, and their rating will exceed 700-horse power. In spite of this great output of electrical apparatus, every portion of which finds an immediate sale, nearly all the factories are behind in their orders to such an extent that it is nearly impossible to fill orders under 60 days. Motors have been introduced for every conceivable purpose to which power can be applied, and small industries run by electric-power have started up in many places where steam power could not have been utilized. The use of the storage battery is also rapidly increasing.

ELECTRICITY ON THE SUEZ CANAL.—The use of electrical lights, by which business may be pushed as rapidly by night as by day on the Suez Canal, has doubled the capacity of that great international thoroughfare. Were it not for the electric lights, immediate preparations would have to be made for increased facilities by enlarging the width of the canal. It is claimed by the managers that the effect of the electric light has been the same as if the canal had been increased from 22 meters, its present width at the bottom, to 32 meters, an operation which would have cost the company \$20,000,000.

FLORIDA FIBERS.—A company in Florida has for several years past been manufacturing cordage, mattresses, etc., from bear grass, sisal hemp, palmetto, jute and other Florida fibers with much success. It is now manufacturing a substitute for hair in mortar used in plastering.



A. T. DEWEY.

W. B. EWER.

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SAN FRANCISCO:

Saturday, April 26, 1890.

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Passing Events.

The fact that the Risdon Iron Works of this city will put in ships for Cruisers Nos. 2 and 6 shows that our shipbuilding industry in California is likely to increase largely, since this firm is prepared to establish the necessary plant to do this Government work. The Risdon has done a great deal of successful marine work, but this will be its first attempt on large Government vessels. It has already furnished machinery for some of the smaller Government craft.

The merchants of the city have subscribed \$10,000 to the foundrymen to aid them in their present emergency, in order to assist in putting a speedy end to the molders' strike, which is doing so much harm to the local iron industry. This substantial money aid and the increasing numbers of molders in the shops, are very satisfactory signs to the foundrymen that they will eventually win.

The earthquake of Thursday morning was the most vigorous, with one exception, since the memorable one of 1868.

There is a great quantity of snow on the mountains and water will be abundant for mining operations for a long season. At present there is still rather too much, as pumps are everywhere kept busy. The mining industry will make a good showing this year.

THE House Committee on Naval Affairs has reported back favorably the bill for the relief of the Union Iron Works of San Francisco and to allow them the amount of the penalty of \$33,384 exacted by the Government and retained from the contract price for the construction

tion of the cruiser Charleston because of the failure to secure the required horse-power. The report sets forth that the trouble was not with the contractors, but with the plans and specifications furnished by the Government, which were strictly followed in the construction of the vessel. While the horse-power developed is less than was expected, the speed is greater than was designed, and as speed was the great object sought to be obtained by the horse-power, the Government has in the result a better vessel than was contemplated by the contract.

Drift Mining in Placer County.

The Hogsback Mine on the Forest Hill Divide.

The Hogsback drift mine, on the Forest Hill divide, Placer county, consists of several locations comprising 682 acres in all. The stock is all held in Paris, France, the name of the company being the "Compagnie des Mines d'Or du Forest Hill Divide," with Eugene Raveney as president. The original company which owned this ground prospected it by a short tunnel and broke through into cement, finding their tunnel too high. They donated the property to the present company for \$25,000, and a purchase was concluded. The new company commenced work April 28, 1888. They ran a 7x8 tunnel 80 feet lower than the old one, and broke through into cement. At 1100 feet they made an upraise of 75 feet in bedrock without striking cement, and at 1320 feet they sank four shafts and two stopes a total depth of 226 feet below the bottom of the end of the tunnel, struck 20 miners' inches of water and were "drowned out." The pitch of the bedrock to where they broke through was an average of 38°, and washed very smooth. This tunnel had to be abandoned as not low enough to bottom the channel. Work on the tunnel was commenced by hand on May 18, 1888. A distance of 248 feet was run by hand, three shifts, of five men each, laying their own track and removing their own dirt. The average distance made per week by hand was 35 4 feet. The following statement shows the greatest week's work by hand:

PROGRESS FOR A WEEK 48.7 FEET.	
12 men, 7 days (84 days), at \$3.....	\$252 00
3 men, 7 days (21 days), at \$3.....	63 25
1 man, 7 days (7 days), at \$3.....	24 50
114 lbs. safety niter p. water No. 2, at 18c. per lb.....	20 52
350 feet triple taped fuse, at 72c. per 100 feet.....	2 52
50 lbs. chemical wax candles, 14 oz., at 13c. per lb.....	6 62
2 boxes xxx blasting caps, at 80c. per box.....	1 60
224 feet lumber, at \$22.50 per M.....	5 04
1040 lbs. steel rails (16 lb) (195 ft.) at 4c. per lb.....	41 60
Boles and fish-plates, at 50c. per pair.....	4 00
Car oil.....	15
40 bushels charcoal, at 20c. per bushel.....	8 00
Wear and tear, etc.....	1 00
Total cost.....	\$435 80
Cost per foot.....	8 94

Not a timber was used in this ground, and it is still standing without any.

On the 8th of July, 1888, the Ingersoll straight-line air-compressor, class A, was started, and by December 27th the tunnel had reached a length of 1559.6 feet.

At a distance of 1320 feet, they broke through into a hard mountain cement, and anticipated making greater headway, but found it was very nearly as costly as the rock. During the time they were in bedrock the average progress per week with machine drills was 58.94 feet for 1320.7 feet of tunnel, requiring but 21 sets of timbers, showing that the ground is not soft. Average numbers of holes per shift 10, blasting the cut and top holes first, bottom holes afterward. The two largest runs made for two consecutive weeks were 73 6 feet for the week ending August 4th, and 66.9 feet for the week ending 11th, or respectively, 10.51 and 9.55 feet per diem.

The tunnel runs diagonally across the strike of the rock (the strike, however, varying very much, sometimes being at right angles with the tunnel), which is composed of alternate strata of slate, diorite, and some white barren quartz.

The regular force of men employed consists of 15 miners working 8 hours per day; 2 engineers, working 12 hours per day; 2 drivers, working 12 hours per day; two blacksmiths, working 10 hours per day; one timberman, working 10 hours per day, divided into three shifts, and working two 3½-inch Ingersoll Eclipse drills on columns.

They have three 3½-inch Ingersoll Eclipse drills, and the total cost for all extras for 1559.6 feet of tunnel was \$132.75. A stringent rule was enforced, requiring each drill to be

taken out and thoroughly cleaned once a week.

The actual cost of the 1559 6 feet of tunnel, 7x8 feet, exclusive of management, up to Dec. 27, 1888, was as follows:

	Cost per running foot.
Total labor (including timbering).....	\$12,131 49 \$7 77
Powder, 10,021 lbs., at 14c. (delivered).....	1,478 20 90
Fuse, 23 045 ft., at 54c. per 100, and caps, 840.....	165 59 10
Wood, 522 cords of wood, at \$2 75 (delivered).....	1,435 50 92
Charcoal, 1580 bushels, at 20c.....	316 00 20
Candles, 1755 lbs., at 13c. net.....	232 53 14
Gang planks and ties, 7624 ft., at \$22 50 per M.....	171 54 10
Timbers, 21 sets, at \$1.30 per set.....	37 80 02
Steel rails, etc. (16 lbs.) 20,048 lbs. at 4c. net.....	801 92 61
Air and 1800 ft. 3 in. at 29c. \$531 00	
water pipes 1700 ft. 1 in. at 6c. 102 25	761 43 48
Freight on same 124 18	
Horse feed, hay, 25; barley, 3c. per lb.....	349 60 22
Materials, steel drill parts, oil, tools, etc.....	916 33 58
Totals.....	\$14,797 83 \$11 94
Actual cost per running foot.....	11 94

These tables of progress and cost of tunneling are of great interest to drift miners in this State.

As stated, however, this tunnel was found to be too high, and was abandoned, and another one was started 437 feet lower, at an elevation of 4340 feet above sea level. This new tunnel was started Oct. 18, 1889, and is now in 1230 feet. It will be 2520 feet long when completed to the point where the upraise will be made to cap the channel of auriferous gravel. This upraise will be 190 feet. The course is diagonally across the strike of the rock which is harder than in the upper tunnel. The new tunnel is 7x8 in the clear with a three-inch grade to 100 feet. For the tracks, 16-pound steel rails are used, and the iron cars hold 2200 pounds of slate bedrock. Horses are used to haul the cars.

The air compressor is 600 feet above the present tunnel, where the works are. Air is carried in a three-inch pipe. An 18-inch Pelton wheel at the tunnel mouth runs a Starrevant blower, by water that is brought in an inch and a half pipe from the upper tunnel.

The energetic young superintendent, Mr. W. C. Ralston, kept the work going during the whole of this exceptionally rough winter. John C. McFall, the foreman, is the young man who had charge of the Horseshoe Bannell, below Forest Hill. For nine weeks one shift of men had to be kept shoveling away snow so that the cars could be dumped. A tunnel was made through the snow to the blacksmith shop. They had 18 feet of snow at the tunnel mouth in the ravine, and 21 feet at the office. On the first page of this week's PRESS is a photo-facsimile of the mouth of the tunnel of this mine, made from a photograph taken by Mr. Ralston before the snows set in. Last month they made 217 feet of progress and expect to get in and begin the upraise by the last of October.

The Earthquake.

At 3:37.44 A. M. on Thursday a sharp and vigorous earthquake was experienced here, which was the heaviest shock since the famous one of 1868, with the exception of that of July 31st last. The general direction of the movement was from southwest to northeast, and the duration about six seconds. The seismograph at the Chahot Observatory, Oakland, shows that the actual movement of the earth was only about one-seventh of an inch, but it was very rapid. The earth movements at such times are very much smaller than popularly supposed. The heavy shock of last July showed an actual movement of only three-sixteenths of an inch. Yet in that case and in this one many persons supposed that the movement was several inches. The earthquake of Thursday was fortunately very limited in duration, for if it had lasted very long with the same vigor, much damage to buildings and chimneys might have resulted. The seismograph shows no long swing, but a confused, rapid trembling motion, very quick and sharp. The mean-time clock at the Chahot Observatory was stopped, but the Siderial clock was not. At the time of the July shock the reverse was the case, the Siderial clock alone being stopped. On no occasion have both been stopped at the same time, though each has had its turn on different occasions.

At Buck's ranch, in Plumas county, the snow is packed 20 feet deep on a level. At Letter Box, Judge Clough, who has just arrived at Oroville, says he went down stairs 32 steps to get from the snow into Thomas Townsend's house. The snow there is 25 feet deep and is solidly packed.

The State Mineralogist's Report.

State Mineralogist Wm. Ireland, Jr., has just issued the Ninth Annual Report from the Mining Bureau, a volume of about 300 pages. In addition to the reports of deputies in the field in various counties of the State, there are several original articles as follows: "Refining and Smelting of the Precious Metals," by Sven Gunn's ex- "Auriferous Gravels of California, Geology of their Occurrences and Methods of Exploitation," by John Hays Hammond, M. E.; "Pottery," by Linna Ireland; "River Mining," by R. L. Dann, M. E.; "Value of Fossils as Indications of Important Mineral Products," by Dr. J. G. Cooper; "Clays," by W. D. Johnson; "Manufacture of Glass in California," H. De Groot.

The most complete and practical article in the report is that on "Auriferous Gravels," by Mr. Hammond. It is well illustrated, and describes fully the methods of mining the gravels. Numerous sections of drift and hydraulic mines are given with their geological features. Mr. Hammond describes the various gravel mines and gives the details of the methods of saving the gold, with the various mechanical appliances. A complete list is given of the prominent mining districts in the State, with their location, capacity, cost, etc. Mr. Hammond's paper, like his other one on the "Mining of Gold Ores" last year, is the feature of the report.

Equally useful in its special branch is Mr. Russell Dann's article on "River Mining." This branch of placer mining in California is fully described, and there are numerous illustrations. Mr. Dann gives details which will be useful to all interested in this branch of mining.

The reports on the counties are comparatively short this year, owing to the brief time when field-work was possible for the season. It is announced that a geological map of the State is in preparation by the Bureau.

The Molders' Strike.

The striking molders in this city still hold out in their fight, and do the best they can to prevent the foundrymen from getting men on their molding floors. More Eastern molders continue to arrive, however, and go to work in the shops. Several more came this week and were taken to the Union Iron Works without the strikers being able to see or talk to them. The molders have held a mass-meeting to protest against the importation of labor from the East.

Certain merchants of this city, who are anxious to see the iron trade again revived, have contributed \$10,000 in cash to the Foundrymen's Association, believing that the strike can only be brought to a close by the methods adopted by the foundrymen. Their success seems to depend on whether they can supply themselves with men to take the place of the strikers. This they are now successfully doing. The Risdon has 18 competent molders, as against 15 before the strike. The Union Iron Works has about 18, and other shops a proportional number.

The contract for the work to be done for the California-Street Railroad Company, which has caused so much controversy of late, was awarded to the Union Iron Works Wednesday. It amounts to about \$100,000.

The Risdon Iron Works will enter bids for the construction of Cruisers No. 2 and 6, and an improved plant will be obtained, so that all the work of building the ships can be done here.

More Pelton Wheels for Japan.

Evidence of the progressive character of the Japanese is being constantly furnished by their readiness to adopt American machinery in the prosecution of their various industrial enterprises. We gave a few months ago a description of a water-power hoist furnished the Japanese Government for operating one of their coal mines. A still more extensive order has recently been received from the same source by the Pelton Water Wheel Co., which has been completed, and went forward on the last steamer.

This consists of three eight-foot Pelton wheels of capacity of 108-horse power each working under a 90-foot head, and two double nozzle 6-foot wheels of capacity of 115-horse power each under same head. The former were fitted with the Pelton deflecting nozzle and

hydraulic governor, and the latter with the adjustable slide nozzle and friction governor.

These five wheels, having an aggregate capacity of 554-horse power, are to run dynamos, the power of which is to be transmitted to the city of Kito, two miles distant, to be used for general manufacturing purposes. The work above described is but the first installment of a plant of very considerable magnitude, it being the intention as soon as the present wheels are in place to order 15 more to bring the capacity of the plant up to 2000 horse power.

The water is conveyed to the wheels through 2000 feet of sheet-iron pipe, and the supply is obtained from the Kioto-Fu-Cho canal, a recently constructed work involving a large outlay and a high order of engineering skill, all of which has been supplied by native officials.

The Thompson Engine.

(Concluded from page 281)

canceling an earlier or later cut-off, according to the amount of work that may be on the engine at the moment. The governor is so arranged that a movement of only three-eighths of an inch of the governor-balls causes the engine to cut off at any point along the line, from zero to full stroke, thereby causing a remarkably steady motion, although the load may be constantly shifting.

The governor has a device by which, should the belt break or run off the pulley, the main steam-valve would be immediately closed and the engine shut down.

One of the most remarkable features about this engine is that all four of the valves and the cut-off are operated with but a single joint and one eccentric; said joint serves to connect the eccentric rod with the main valve-rod.

There is a 600-horse power engine of this kind running the Mendocino Lumber Co.'s saw-mill at Mendocino City. Mr. Ford, the superintendent at that place, informs me that the greatest variation he can detect in the speed of the engine, between a full load and nothing, is only a half a revolution.

There are at present a number of these engines running at various places on the Pacific Coast, ranging in size from 600-horse power down to 60, all of which are giving entire satisfaction to the owners and the engineers that run them. We are informed that they stand ready at any time to give the highest testimonials in their favor as to durability, economy, etc.

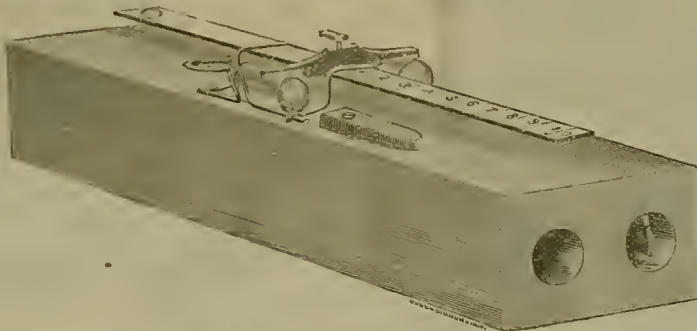
The Golden State and Miners' Iron Works of San Francisco, 231 to 251 First street, one of the oldest and most reliable shops in this city, are the sole builders of this engine for the Pacific Coast States and Territories. They ran one of them at the Mechanics' Institute Fair for 1889, in this city, for which they were unanimously awarded the gold medal. The Committee of Awards in its report says: "This engine, which is of the automatic independent cut-off class, presents many radical improvements upon those which have hitherto been considered the highest type of steam engineering practice, inasmuch as the same results are obtained with a great reduction in the number of working parts and joints. The engine is compact, strong and symmetrical in design, and presents a handsome appearance. It is fitted with four plain slide valves, working entirely independently of each other in separate chambers, all four valves and cut-off being operated with one eccentric. It is a remarkable feature of this engine that all four valves and cut-off are operated with but one joint or working part between them and the eccentric. The cut-off, which is exceedingly rapid, is operated by steam pressure. Owing to its simplicity, repairs would be reduced to a minimum."

If any one requiring further particulars in regard to the engine will communicate with the above mentioned foundry, the information will be furnished. The cut-off mechanism of these engines, with new cylinders, can be applied to any old engine that has either the box-form of frame or the Corliss. The above-mentioned company are driving their shops in this city with a Thompson engine, where it can be seen in operation at any time.

The Carson river is running bank full of water, and all the capacity of the mills is at work upon Cometock ore. The snow, which is piled high in the mountains, insures plenty of water for mining purposes during the summer months.

Mines at Benton, Mono Co.

Mr. W. H. Russell, superintendent of the Little Emily M. & M. Co., Benton, Mono Co., was in San Francisco this week, having come here to see certain lots of ore from the mine worked at the Selby Lead Works. The results are very satisfactory to Mr. Russell and the company. One of the lots amounted to 21,475 pounds net and yielded per ton of 2000 pounds

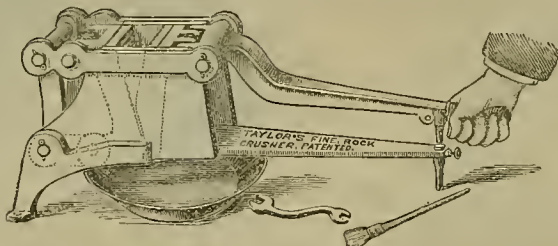


PROSPECTOR'S POCKET SCALE.

\$676.08 in silver, \$2.89 in gold and 5 per cent lead. Another lot of 40,732 pounds gave per ton of 2000 pounds \$195.50 in silver with a small percentage of lead. The silver was sold for 99 cents. The cost of working this ore was \$20 per ton. The railroad charges from

tain any gold, can be ground up fine with water and mercury in an agate mortar, or roasted in a clay dish with a little nitrate of soda, and there amalgamated.

The 4 pound samples are then to be treated as directed in using the batea, and the resulting amalgam put in a piece of charcoal, and the mercury volatilized by the aid of a blowpipe;



TAYLOR'S HAND CRUSHER.

the mine to the Selby works are \$8 per ton for ore working \$50 to \$100 per ton, and \$14 per ton for all working over \$200. The miners at Benton formerly paid \$100 per ton to get their ore brought to San Francisco.

From the Little Emily mine altogether some \$300,000 has been taken out in the last ten

years. The mine has been worked for 20 years. It is looking very well indeed at present, and the ore is rich. They are running a crosscut and extending the main tunnel. There are now no mills at Benton, so that all the ore has to be shipped away for reduction.

Mr. Russell says that mining matters are looking up in that region, and in Inyo county prospects are better than ever known before. The section referred to is a very encouraging one for prospectors now that there is a railroad to take the ore from the mines.

THE Nevada City Transcript says: In the Deer Creek claim at Mooney Flat, Measra. Ayer & Co. recently struck gray and blue gravel at a depth of 62 feet, and the shaft has since been sunk into it a depth of 10 feet without reaching bedrock. The gravel pays from \$20 to \$50 a ton. Some years ago Geo. McLean and others ran a \$250,000 bedrock tunnel to open this channel, but missed the mark and quit in disgust.

THE new patent combination rails, known as the Bargion rails, which the Southern Pacific Company has decided to give a test with a view to adopting them for general use over the system, are being laid on the Seventh-street local track, in Oakland, where it is thought they will be given a severe test.

ABOUT 100 men are at work on the electric street railroad in Oakland,

Sampling Auriferous Quartz.

(Concluded from page 281)

When all the gold is well collected in the center of the batea, a little pure mercury is added, sufficient to form a hard amalgam. This mercury being rubbed by the finger covered by a coat, will rapidly take up the gold, the wooden surface of the batea greatly assisting the operation.

The pyritic matter left, if thought to con-

of round glass. On the right-hand side of the fulcrum ten divisions are marked at equal distances from each other, and on the left-hand side a small depression is made to receive the globules of metal or a small pan for gold-dust. Above the fulcrum is a small vane, which being turned to the right or left adjusts the beam to equilibrium. The two small wires resting upon the beam keep it in place while the globules to be weighed are being placed on the beam. By a very slight pressure with the finger the wires are raised and allow the beam to work.

The number of weights required are three, made of flattened wire, viz.: 10 grains, 1 grain and one-tenth of a grain. The weights are moved from one division to another as required to balance the globules, keeping the flat side on the line of division.

This balance is very sensitive and will weigh to the one-thousandth part of a grain.

Holes are made in the wooden block to hold the blowpipe, pinettes, weights, charcoal, etc. The following table is to be used in connection with the balance:

PROSPECTOR'S AND MINER'S GOLD TABLE, TO DETERMINE FREE GOLD PER TON OF 2000 POUNDS AVOIRDUPOIS. SAMPLE FOR WORKING TEST, FOUR POUNDS AVOIRDUPOIS, 28,000 GRAINS.

Weight of washed gold; four-pound sample in grains and tenths.	Finest, 200 value per oz. \$17.15	Finest, 200 value per oz. \$18.05	Finest, 200 value per oz. \$19.05	Finest, 200 value per oz. \$20.05
5 grains.....	\$82.07	\$89.26	\$94.26	\$99.05
4 grains.....	67.18	71.40	75.36	79.24
3 grains.....	50.38	53.45	56.52	59.43
2 grains.....	33.59	35.74	37.68	39.62
1 grain.....	16.79	17.87	18.84	19.81
.9 grain.....	15.11	16.08	16.95	17.82
.8 grain.....	13.43	14.29	15.07	15.84
.7 grain.....	11.75	12.51	13.19	13.86
.6 grain.....	10.07	10.74	11.31	11.88
.5 grain.....	8.40	8.93	9.42	9.90
.4 grain.....	6.71	7.14	7.53	7.92
.3 grain.....	5.03	5.36	5.65	5.94
.2 grain.....	3.36	3.51	3.76	3.96
.1 grain.....	1.68	1.78	1.88	1.98

Each grain of gold obtained after washing will, therefore, equal one ounce per ton. If the gold be—

750 fine, each ounce will be worth.....	\$15.50
800 fine, each ounce will be worth.....	16.53
850 fine, each ounce will be worth.....	17.57
875 fine, each ounce will be worth.....	18.08
900 fine, each ounce will be worth.....	18.60
920 fine, each ounce will be worth.....	19.01
920 fine, each ounce will be worth.....	19.22
930 fine, each ounce will be worth.....	19.43
950 fine, each ounce will be worth.....	19.63

Hence, multiply the value per ounce by the number of grains to give the value per ton. Example: If the washed gold weighs 2 grains, and the fineness be known or estimated at say \$16.53 per ounce, the sample above \$16.53 x 2 = \$33.06 per ton.

Mines and Mills of Shasta County.

NUMBER I.

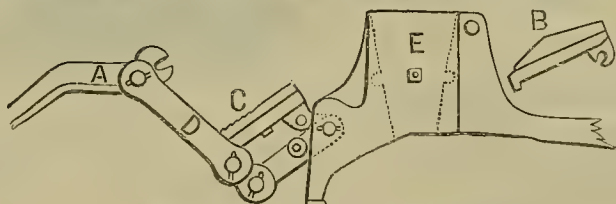
[From Our Traveling Correspondent.]

When one steps into Shasta county to inspect the mines and mills, be naturally landed at Redding as the starting-point for getting posted. Although Redding is located on the plain (formerly known as Reading Ranch) yet within a radius of 10 miles there are many mines, and more mines than mills. The several mining districts surrounding are Lower Springs, Shasta and Old Digging.

Redding is quite a neat little town of about 1500 inhabitants, with all the modern advantages, as water works, electric lights, gas works, etc., a well-conducted and neat post-office. It has two banks, a fine large brick schoolhouse, and I don't know how many churches, as your correspondent like most miners has more use for the banks than the churches.

Redding is reached in 10 hours and 40 minutes from San Francisco. It may be considered at the foot of the great mineral ranges and at the head of the Sacramento valley, and is on the direct line of the Oregon & California railroad. Redding in time ought to be a large and good business locality, taking the vast mineral section of Shasta into consideration. I forgot to say that Redding has two weekly papers, the Free Press and the Shasta Democrat. Mining is where the wealth comes from, in two ways: First, mines bring capital into the county and then the mines bring out capital; thus one good mine discharges more money in a twelvemonth than a dozen ranches. Shasta county, from what I learn in Redding, is the richest mining county in all the State of California, but as to this I will know more after I have taken it all in.

There is one advantage, all the mining sections have fine facilities, as railroad communication, postoffices, telegraphs, etc. This I get from asking questions as to how and where to go. There are no long and tedious trips to worry you out, and a good deal can be seen in a short time if one wants to fly through, but as your correspondent has a reserve cash fund to draw on, he is going to take it easy and not worry his brains as much as he may worry others by not scratching off for the Press all he hears. The past winter has been very severe, nearly all the mills being compelled to stop work from one cause and another, but one by one they are getting their repairs made and are starting in again. The weather is now fine and spring-like.



SECTION OF HAND CRUSHER.

crushed and afterward in having the gold washed out of the crushed rock and amalgamated without loss of gold.

The Taylor hand-crusher I found answered very well for the crushing, and the improved form of batea for washing out and amalgamating the gold; but to complete the outfit, I required a portable, accurate and cheap balance. After many attempts, in which I was kindly as-



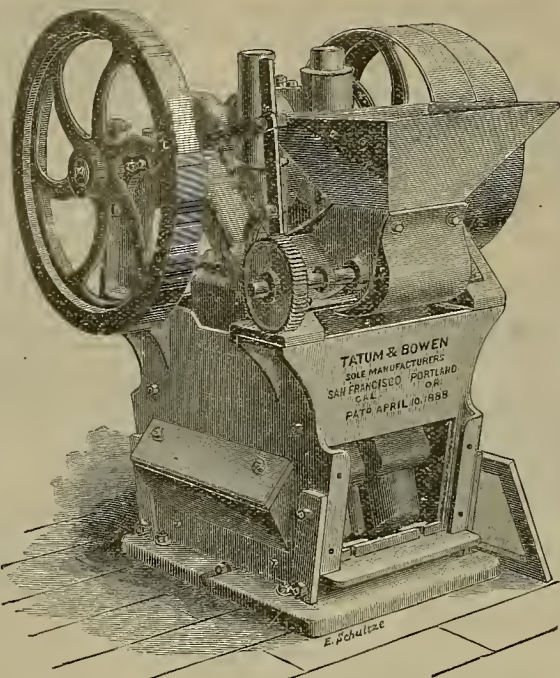
THE BATEA.

sisted by M. G. Rockwell and M. Bohn, and taking Dr. Bleck's invention as a model, I have at last succeeded in making a balance which, I think, will answer the purpose as well as Messrs. Taylor are now making one something after the same pattern but with improvements.

The balance and frame, as shown by the accompanying drawing, is about seven inches long and one and a half wide and one inch deep. The balance is a German-silver beam, six inches long and one-fourth of an inch wide; the fulcrum knife-edged and the bearing pieces

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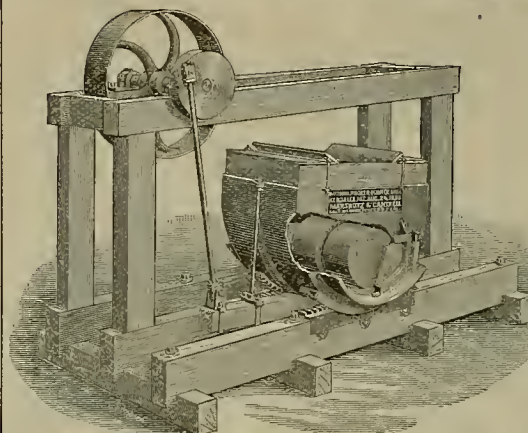
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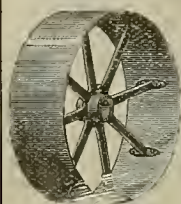
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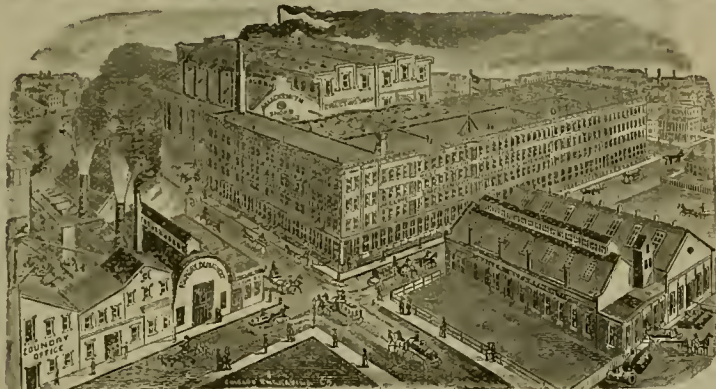
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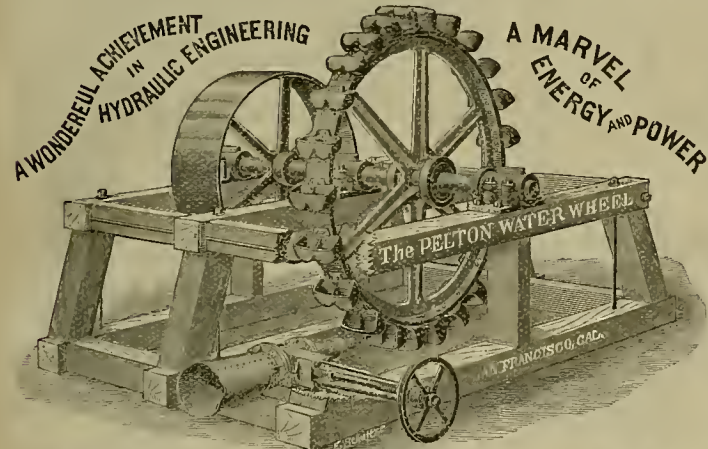
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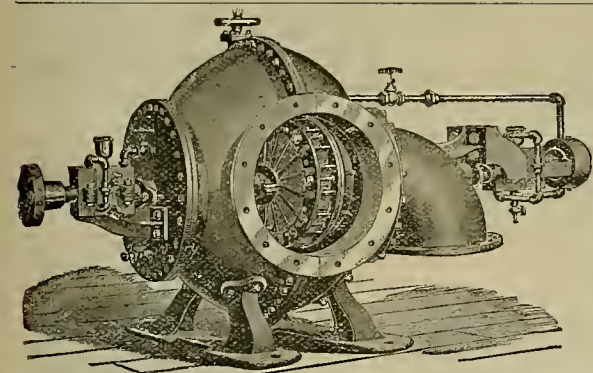
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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, April 24, 1890.

Trade in all branches continues free. With the foundrymen there appears to be a better feeling, owing to their being more successful in securing molders. It now looks as if they will be soon in full running condition, which will enable them to accept all orders sent at far more satisfactory figures to all in interest than previous to the iron-molders' strike. It is very generally claimed that more mining machinery will be wanted this year than for several years past. It is also claimed that the requirements for other machinery and ironwork are of a very promising character.

The local money market is reported easy, with no decided call for funds for any particular purpose; while remittances are quite free. The more favorable consideration of Congress looking toward remonetizing silver is having a favorable influence. When enacted into a law, it will revive speculation and also many languishing industries.

MEXICAN DOLLARS—The market is dull but firm at 79 1/2 @ 79 3/4 c.

Mexican dollars to-day are quoted at 79 1/2 to 80 cents strong.

SILVER—The market abroad made quite an upward move, due to the favorable action of the Congressional Committee having the Silver bill in charge. It set back again at the first signs of disagreement, only to recover with an amicable understanding arrived at. The Republican caucus has agreed on a plan of action, viz., the purchasing monthly of 4,500,000 ounces of silver at the market price thereof, not exceeding \$1 for 371.25 grains of pure silver, and issuing in payment Treasury notes of the United States in denominations of not less than \$1 nor more than \$1000; the Treasury notes to be redeemable on demand in lawful money of the United States. The legal-tender quality of the notes is restricted to the payment of customs dues and public debts, and shall be counted as part of the reserves of the National banks. A holder of the notes can upon demand receive, in lieu of coin, silver bullion at its market value on the day when the demand is made. Several Republican members favor free coinage, and unless still more favorable action is secured to the silver interest of the country, they may act with the Democrats in passing a free-coinage Act.

With the Comstock ore going largely gold and favorable legislation on silver by Congress, the European nations will undoubtedly be more favorably disposed toward the metal.

The Mint the past week paid \$1.01 an ounce, then dropped to 99 cents, advanced again to \$1, and to-day pays \$1.01, with a rising tendency. London was cable to-day 47d, and New York came through at \$1.05. This latter price is above the English parity. The parity in our (San Francisco) market is from \$1.03 to \$1.03 1/2. The advance in New York is largely due to an active speculation in silver warrants, which have been dead for at least four years. It is claimed by those who are in position to know that the New York market for silver warrants will advance to still higher figures, probably to \$1.10, before there is much of a set-back.

QUICKSILVER—Receipts the past week aggregated 494 flasks. The market continues to hold strong, with a good demand ruling.

BORAX—Receipts the past week aggregated 567 cts. The market is fairly steady, with a good demand ruling from the East.

LIME—Receipts the past week aggregated 6384 bbls. The home demand continues quite active, necessitating free receipts. Quotations are unchanged.

LEAD—The market is reported unchanged. Eastern advices are unsatisfactory. This denotes more or less uncertainty in the near future.

COPPER—With better mountain transportation facilities, the receipts ought to show some increase at the seaboard ports. The market has ruled fairly steady. In this country the consumption is still quite large. London cables report the market has been affected by the depression prevailing in the general metal trade, and the business in merchant bars is slow. Consumers are buying other sorts than Chili bars, owing to slack deliveries of the latter. The large quantity held by outside French financiers is being absorbed. Large holders will not sell below £50.

IRON—With cheapening markets abroad and at the East, and freights not so stiff, our market begins to show an easier tone. The consumption is beginning to show a steady increase as more molders are secured by the foundrymen. The London cable to the Iron Age of April 17th reports as follows: There has been a further serious decline in prices of warrants, due to heavy realizations on the part of holders. Scotch sold down Tuesday at 45s. 7d. and closed at 45s. 11d. Middlesbrough dropped to 45s. 7d. and Hematites to 45s. 11d. To-day there were sales at 46s. for Middlesbrough and 45s. 6d. for Hematites.

Quotations to April 6th of Scotch pig are as follows:

No. 1 Coltness, f. o. b. Glasgow	70s. 6d.
No. 1 Summerlee, " "	70s.
No. 1 Langley, " "	69s.
No. 1 Langloan, " "	70s.
No. 1 Carabrook, " "	70s.
No. 1 Shorts, " at Leith	71s.
No. 1 Glenarnock, " Ardrossan	70s.
No. 1 Dalzell, " "	69s.
No. 1 Eglinton, " "	49s. 6d.

Since writing the above on iron, a more thorough canvass of the iron market shows that there are only about 1000 tons in first hands, which is firmly held. The feeling with holders is bullish. The imports the past week were 400 tons pig iron from England.

TIN—The market is fairly steady at unchanged quotations. English advices report an easier market.

COKE—Imports the past week aggregated 750 tons. The market is steady, with holders firm.

COAL—Imports the past week aggregated as follows: Coos Bay, 1150 tons; Puget Sound, 1200; Comox, 4200; Seattle, 3259; Nanaimo, 2308; De-

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS

ASSESSMENTS.							
COMPANY.	LOCATION.	No.	AM'T. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Acme L & M Co.	California.	10.	3.	Mar 20.	May 15.	June 9.	J. M. Buffington. 303 California St.
Alabama M Co.	Nevada.	1.	8.	Mar 18.	Apr 22.	May 13.	W. H. Watson. 302 Montgomery St.
Alpha Cons M Co.	Nevada.	4.	25.	Apr 5.	May 16.	June 6.	C. S. Elliott. 309 Montgomery St.
Andes S M Co.	Nevada.	36.	25.	Apr 10.	May 14.	June 3.	J. S. Hawkins. 309 Montgomery St.
Bailey M Co.	Nevada.	1.	8.	Mar 18.	Apr 22.	May 13.	W. H. Watson. 302 Montgomery St.
Confidence S M Co.	Nevada.	15.	75.	Mar 12.	Apr 16.	May 7.	A. S. Groch. 414 California St.
Cons Imperial M Co.	Nevada.	27.	5.	Apr 17.	May 22.	June 11.	O. L. McCoy. 339 Pine St.
Del Monte M Co.	Nevada.	3.	20.	Apr 16.	May 25.	June 13.	J. W. Pew. 310 Pine St.
East Best & Belcher M Co.	Nevada.	1.	25.	Feb. 11.	Mar 14.	Apr 6.	C. W. Mason. 310 Pine St.
Eureka Cons M Co.	California.	1.	3.	Feb. 24.	Apr 5.	May 28.	W. H. Rabe. 224 Montgomery St.
Gold Hill M Co.	California.	9.	25.	Apr 17.	May 24.	June 10.	C. A. Gross. Phelan Block
Hale & Norcross M Co.	Nevada.	95.	50.	Apr 9.	May 14.	June 5.	A. B. Thompson. 309 Montgomery St.
Hartford M Co.	Nevada.	7.	2.	Apr 8.	May 15.	June 6.	J. J. Hermann. 303 California St.
Holmes M Co.	Nevada.	1.	25.	Mar 4.	Apr 14.	May 19.	J. W. Pew. 310 Pine St.
Humboldt M Co.	Nevada.	1.	8.	Mar 18.	Apr 22.	May 13.	W. H. Watson. 302 Montgomery St.
Indian Creek M Co.	California.	1.	10.	Mar 12.	Apr 14.	May 14.	S. C. Mills. 419 California St.
Martin White M Co.	Nevada.	23.	25.	Feb. 12.	Mar 31.	Apr 30.	A. B. Cooper. 325 Montgomery St.
Mayflower Gravel M Co.	California.	46.	50.	Mar 8.	Apr 10.	May 1.	J. Morris. 328 Montgomery St.
Navajo M Co.	Nevada.	17.	20.	Apr 8.	May 14.	June 5.	J. W. Pew. 310 Pine St.
North Belle Isle M Co.	Nevada.	1.	25.	Apr 16.	May 21.	June 25.	J. W. Pew. 310 Pine St.
North Commonwealth M Co.	Nevada.	3.	25.	Apr 16.	May 21.	June 25.	J. W. Pew. 310 Pine St.
North Occidental M Co.	Nevada.	2.	6.	Mar 11.	May 5.	May 26.	W. H. Watson. 302 Montgomery St.
Ophir M Co.	Nevada.	11.	25.	Mar 12.	Apr 17.	May 8.	C. S. Elliott. 309 Montgomery St.
Potosi M Co.	Nevada.	34.	10.	Mar 28.	Apr 30.	June 9.	A. W. Waterman. 303 Montgomery St.
Potosi M Co.	Nevada.	5.	50.	Mar 27.	Apr 30.	May 21.	C. E. Elliott. 309 Montgomery St.
Quaker G M Co.	California.	18.	20.	Mar 8.	Apr 5.	May 5.	A. Cheimant. 328 Montgomery St.
Silver Hill M Co.	Nevada.	26.	25.	Apr 14.	May 20.	June 11.	D. O. Bates. 309 Montgomery St.
Standard Cons M Co.	California.	2.	25.	Mar 4.	Apr 14.	May 19.	J. W. Pew. 310 Pine St.
Union Cons M Co.	Nevada.	40.	25.	Mar 5.	Apr 10.	May 30.	J. M. Buffington. 303 California St.
Utah Cons M Co.	Nevada.	9.	25.	Mar 11.	Apr 17.	May 6.	A. H. Fish. 309 Montgomery St.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING DATE
Church G. M. Co.	California	J. M. Buffington	303 California St.	Annual. May 5
Diana G. M. Co.	California	J. W. Pew	330 Pine St.	Annual. May 6
Morgan M. Co.	California	L. C. Bresse	331 Montgomery St.	Annual. May 3
Natoma M. & M. Co.	California	D. H. Ward	323 Montgomery St.	Annual. May 3
Teresa M. Co.	California	A. Cheimant	323 Montgomery St.	Annual. May 30
Justice M. Co.	Nevada	R. E. Kelly	414 California St.	Annual. May 5
Volcanic Hydraulic M. Co.	California	M. Oasey	508 California St.	Annual. May 7

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Champion M. Co.	California	T. Wetzel	522 Montgomery St.	10.	Jan 20
Candelaria Cons M. Co.	Mexico	G. Gato	308 Montgomery St.	25.	Apr 5
Caledonia M. Co.	Nevada	A. S. Groch	414 California St.	68.	Apr 1
Calumet & Hecla M. Co.	Nevada	A. W. Havens	309 Montgomery St.	10.	Apr 1
Debec Blue Gravel M. Co.	California	T. Wetzel	522 Montgomery St.	10.	Apr 24
Idaho M. Co.	California		Grass Valley	2 50.	Mar 7
Diablo M. Co.	Nevada	R. Heath	319 Pine St.	30.	Oct 31
Pacific Borax Salt & Soda Co.	California	A. H. Clough	230 Montgomery St.	1 00.	Feb 10

parture Bay, 2350; total, 14 467 tons. For loading two brands of English are cheaper. Australian for prompt loading is strong, but as charters are strengthening here, it is claimed that more vessels will be likely to load there for this port, so as to load wheat hence for Europe. On spot, steam and gas coals are stiff, but household coals are easy. The consumption of the latter is falling off, while that of the former is increasing.

Eastern Metal Markets.

By Telegraph.

NEW YORK, April 24, 1890.—The following are the closing prices the past week:

Silver In	Silver in	Copper.	Lead.	Tin.
Thursday... 46 1/2	1 00 1/4	\$14 20	\$3 85	\$19 80
Friday... 46 1/2	1 00 1/4	14 20	3 85	19 70
Saturday... 46 1/2	1 00 1/4	14 20	3 87 1/2	19 80
Monday... 46 1/2	99 3/4	14 20	3 87 1/2	19 95
Tuesday... 46 1/2	99 3/4	14 20	3 87 1/2	19 75
Wednesday... 46 1/2	1 00 1/4	14 20	3 87 1/2	19 80

NEW YORK, April 22.—Quicksilver fairly steady. Borax is firm. Outside of the deliveries of old contracts nothing in copper; Lake, 1 1/4 @ 1 1/2 c; hids rejected; Arizona, 13 @ 13 1/2 c; casting, 12 1/2 @ 12 3/4 c. No reaction in pig lead; \$3.85, \$3.75 full.

Mining Share Market.

The mining share market for the Comstocks set back, with slight reactions up to Monday, when the lowest prices were reached. Since then the market has gradually strengthened, with no particular stocks in the lead. The movements are more general than at any time since the first signs of a deal being on foot. As usual, the street is full of rumors, with the bear points predominating. While we think the market will do better, yet outsiders will do well to keep in mind that it may result as usual in peddling out stocks, and then letting the market go down again, or in other words, an assessment deal. In the outside stocks the Bodies and Quijotas have been steady. The Tuscaroras had quite an upward move under a reported contest for the control of Commonwealth. Last year there was a reported contest for Bodie. The stock advanced, but afterward went down on assessments to about one-ninth what it sold for to outsiders. Election contests are dangerous for outsiders. Holmes advanced to \$4 a share, but no business was done, owing, probably, to the better-informed knowing that a suit is still pending for \$2,000,000 damages, brought against the company by Southern Nevada.

From the mines, our advices are favorable from the Quijotas. The official letters from the Bodies report a large amount of active prospecting going on. From the Tuscaroras, official letters are still favorable. From the Comstock, reliable advices report quite an improvement on the 1600-foot level to the west. From the other North End mines, the work going on is said to be of an important character. In Hale & Norcross there is an improvement on the 1300-foot level. The pulp assays are higher. An improvement is reported in Chollar. In Potosi it is said that they will soon drift for the ore found in sinking the winze. The official letters of Confidence and Challenge are of the same character as given last week. They will commence next week putting the pump in place in Crown Point, to pump out the mines at that end.

General advices from the Gold Hill mines are favorable, but it is not likely that the manipulators will let much leak out until they are ready to sell stocks.

The official letter from the superintendent of the Kentucky Mining Co., Virginia, Nevada, reports active prospecting, with flattering prospects on the 900-foot level, and that in the winze they are sinking below the 950-foot level they are still in ore. The assays range from \$15 to \$72 a ton.

The continued advance in silver gives promise of a more active and higher stock market.

THE party of prospectors who invaded the Navajo reservation in New Mexico, in search of the lost Adams mine, have reported having found such rich mineral indications that endeavors are to be made to secure the passage of a bill detaching the district in the Carrizo mountains from the reservation.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING APR. 3.	WEEK ENDING APR. 10.	WEEK ENDING APR. 17.	WEEK ENDING APR. 24.
Alpha.....	1.00	1.40 0.05	1.15 1.10	1.45 1.00
Alta.....	1.20	1.49 1.15	1.28 1.25	1.49 1.15
Andes.....	.55	.63 .55	.65 .60	.70 .45
Belcher.....	2.05	2.75 2.00	2.40 2.15	2.65 2.10
Bodie & Belcher.....	1.10	1.30 1.00	1.25 1.15	1.50 1.00
Bodie Con.....	.50	.60 ..	.55 .60	.70 .60
Bulwer.....	.20	.. .. 20	.. .. 25	.. .. 25
Commonwealth.....	2.60	2.81 2.60	2.85 2.50	2.55 2.55
Con. Va. & Cal.....	4.40	4.74 4.00	5.12 4.35	5.08 4.70
Challenge.....	1.60	1.90 1.65	1.85 1.90	3.70 1.92
Chollar.....	3.20	5.00 3.55	6.00 3.25	5.00 2.85
Confidence.....	3.00	4.00 3.50	4.00 4.00	8.00 3.12
Con. Imperial.....	.40	.45 .40	.40 .40	.35 .35
Columbia.....	2.05	2.65 2.05	2.65 2.50	3.10 2.35
Crown Point.....	2.05	2.65 2.05	2.65 2.50	3.10 2.35
Crocker.....	.25	.30 .30	.. .. 25	.. .. 30
Del Monte.....	.95	1.10 1.00	1.10 .85	1.00 .85
Deer Creek.....	.. .. 30	.. .. 35	.. .. 35	.. .. 4.00
Eschschuer.....	.. .. 30	.. .. 35	.. .. 35	.. .. 40
Grand Prize.....	.60	.65 .30	.35 .40	.55 .46
Gould & Curry.....	1.60	2.15 1.65	2.05 1.75	2.25 1.50
Hale & Norcross.....	2.83	3.05 2.60	3.10 2.50	3.15 2.30
Holmes.....	4.40	4.74 4.00	5.12 4.35	5.08 4.70
Justice.....	.80	1.00 .30	.40 .40	.40 .25
Kentuck.....	.85	1.70 1.25	1.40 1.35	1.60 1.20
Lady Wash.....	.. .. 30	.. .. 30	.. .. 35	.. .. 40
Monoc.....	.35	.40 ..	.. .. 35	.. .. 40
Mexican.....	3.25	3.85 3.25	4.00 3.60	4.15 3.05
Navajo.....	1.10	1.20 1.10	1.10 ..	1.15 .25
North Belle Isle.....	1.10	1.20 1.10	1.10 ..	1.15 .25
Nev. Queen.....	.60	.65 ..	.. .. 60	.. .. 65
Occidental.....	1.00	1.25 1.00	1.15 1.05	1.65 1.15
Ophir.....	1.10	1.45 1.30	1.45 1.35	5.00 1.70
Overman.....	1.10	1.45 1.30	1.45 1.35	1.75 1.30
Potosi.....	4.40	5.00 3.45	6.00 3.65	6.37 3.20
Peerless.....	.20	.. .. 20	.. .. 25	.. .. 20
Per.....	.20	.. .. 15	.. .. 20	.. .. 25
Savage.....	1.80	2.60 1.40	2.40 2.60	2.40 1.25
S. B. & M.....	1.35	1.75 1.35	1.50 1.35	1.75 1.25
Sierra Nevada.....	2.34	2.80 2.25	2.90 2.60	2.95 2.25
Silver Hill.....	.35	.50 .35	.. .. 35	.. .. 35
Scorpion.....	2.30	2.77 2.35	2.90 2.75	3.49 2.45
Union Cons.....	2.30	2.77 2.35	2.90 2.75	3.49 2.45
Utah.....	.50	.85 .60	.75 .75	1.20 .85
Yellow Jacket.....	2.20	2.75 2.20	2.75 2.55	3.10 2.50

Sales at San Francisco Stock Exchange.

THURSDAY, APR. 24, 9:30 A. M.		250 Exchequer.....	65c
200 Andes.....	50c	100 G. & C.....	1.75
300 Alpha.....	1.10	100 Hale & Nor.....	2.40
250 Belcher.....	2.30	100 Iowa.....	.35c
150 B. & Belcher.....	5.15	200 Kentucky.....	1.06
100 Belle Isle.....	.60c	550 Mexican.....	3.40
50 Bodie.....	.65c	100 Occidental.....	1.20
700 Bullion.....	1.20	250 Ophir.....	3.90
350 Bulwer.....	.25c	400 Overman.....	1.40
350 Challenge.....	2.50	300 Potosi.....	.30
950 Chollar.....	3.45	200 Savage.....	1.90
250 Commonwealth.....	3.35	500 S. B. & M.....	1.35
150 Crown Point.....	2.65	300 Sierra Nevada.....	2.40
200 Con. Imperial.....	.40c	100 Utah.....	.35c
50 Con. Cal. & Va.....	.70	200 Union.....	2.75

Coal.

Per Ton.	Per Ton.
Australian.....	7 50 @ 7 75
Liverpool Splm.....	8 50 @
Scotch Splm.....	8 60 @ 9 00
Cardiff.....	9 00 @ 9 50

SPOT FROM YARD.	SPOT FROM YARD.
Wellington.....	9 00
Gréta.....	8 50
Westminster Brynmh.....	9 00
Nanaimo.....	9 00
Sydney.....	8 50
Gilman.....	7 00

Bullion Shipments.

We quote shipments since our last and shall be pleased to receive further reports: Eureka Con., April 21, \$4000; Mt. Diablo, 23, \$5985; Savage, 19, \$18,000; Hale and Norcross, 19, \$2400; Cons. California and Virginia, 19, \$54,072.

Don't Fail to Write.

Should this paper be received by any subscriber who does not wish it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

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- E. B. BUCKMAN—Santa Cruz Co.
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- E. B. TAYLOR—San Joaquin Co.
- JOHN B. HILL—San Diego Co.
- E. H. SCHARFF—Cavarras and Tuolumne Co's.
- FRANK S. CHAPIN—Colusa and Tehama Co's.
- W. B. FROST—Merced and Stanislaus Co's.
- GEO. WILSON—Sacramento Co.
- T. M. STARKES—Sierra Co.
- H. KELLEY—Modoc Co.
- H. B. PARKER—Del Norte Co.
- WM. H. HILLARY—Oregon.
- H. G. PARSONS—Oregon.
- R. G. HUSTON—Montana.</

Assessment Notices.

HOME MILL AND MINING COMPANY: Location of principal place of business, San Francisco, California. Location of Works, Amador County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 20th day of March, 1890, an assessment, No. 10, of 3 cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 11, No. 303 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of May, 1890, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, THE 9th DAY OF JUNE, 1890, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
J. M. BUFFINGTON, Secretary.
Office, Room 11, No. 303 California Street, San Francisco, California.

GOLD HILL MINING COMPANY: Location of principal place of business, San Francisco, California; location of works, Grass Valley, Nevada County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 17th day of April, 1890, an assessment (No. 9) of Twenty-five Cents per share was levied upon the capital stock of the Corporation, payable immediately, in United States Gold Coin, to the Secretary, at the office of the Company, Room 20, Phelan Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 24th day of May, 1890, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 10th day of June, 1890, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.
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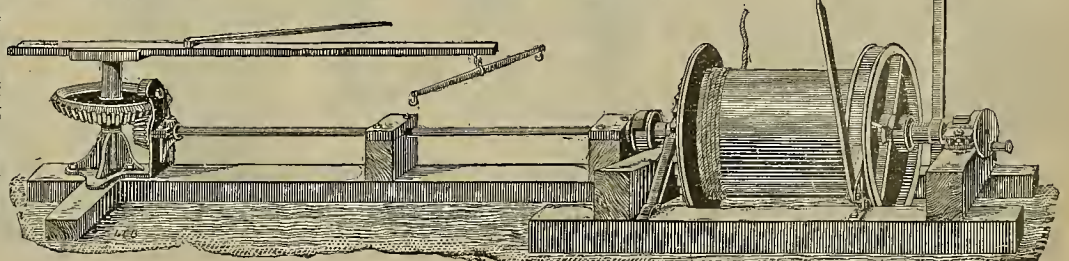
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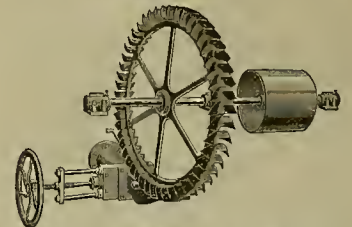
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E. P. HEALD, President.

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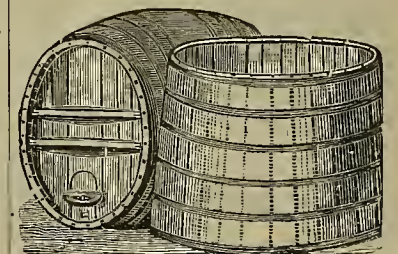
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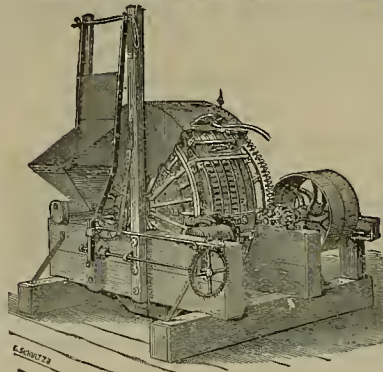
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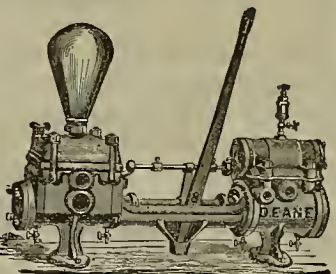
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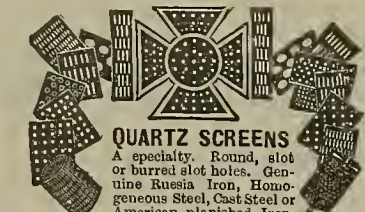
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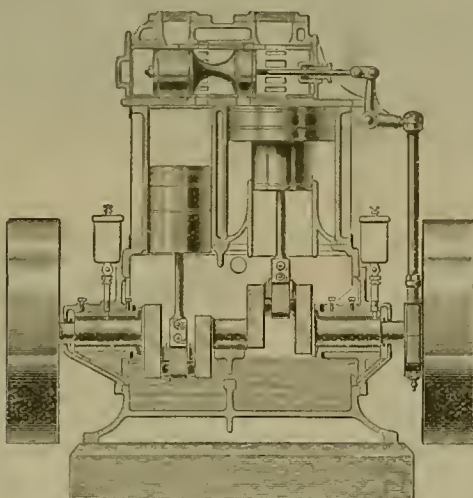
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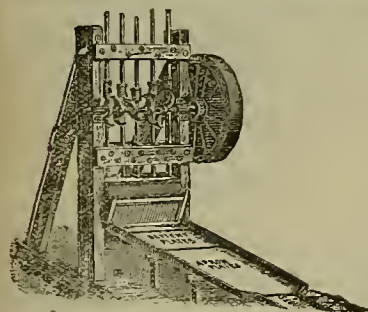
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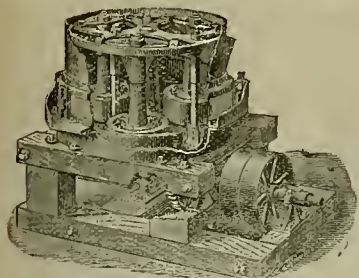
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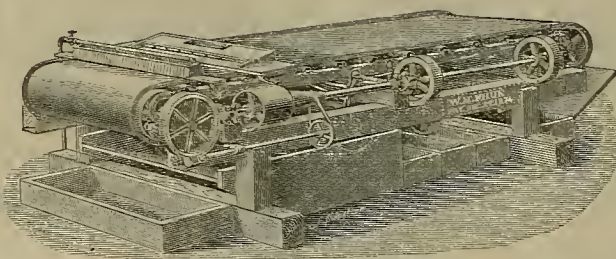
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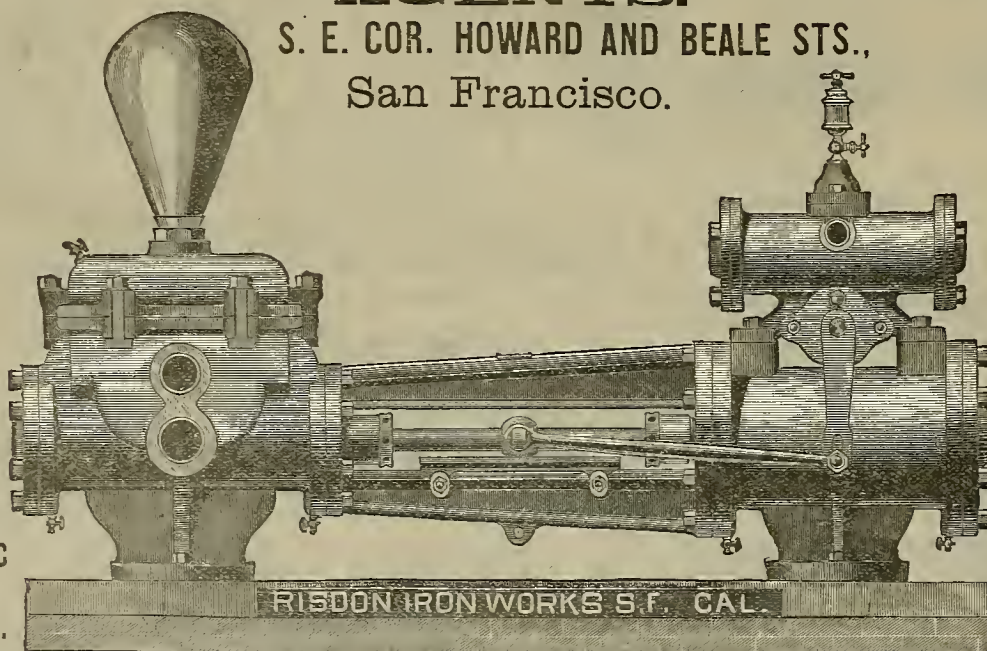
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THE TRANSEPT, KAIBAB DIVISION, GRAND CANYON OF THE COLORADO—AN AMPHITHEATER OF THE SECOND ORDER.—See page 302.

Lake Nicaragua.

Telegrams this week from New York state that ex-Senator Warner Miller, president of

the Nicaragua Canal Co., expects to see the canal finished within seven years, and has little doubt that the money will be forthcoming to keep up the work steadily. He dwelt at length

on the advantages of the canal to the Pacific Coast. He said that the opening of the canal would create a large carrying trade between the Gulf States and the western coast of South

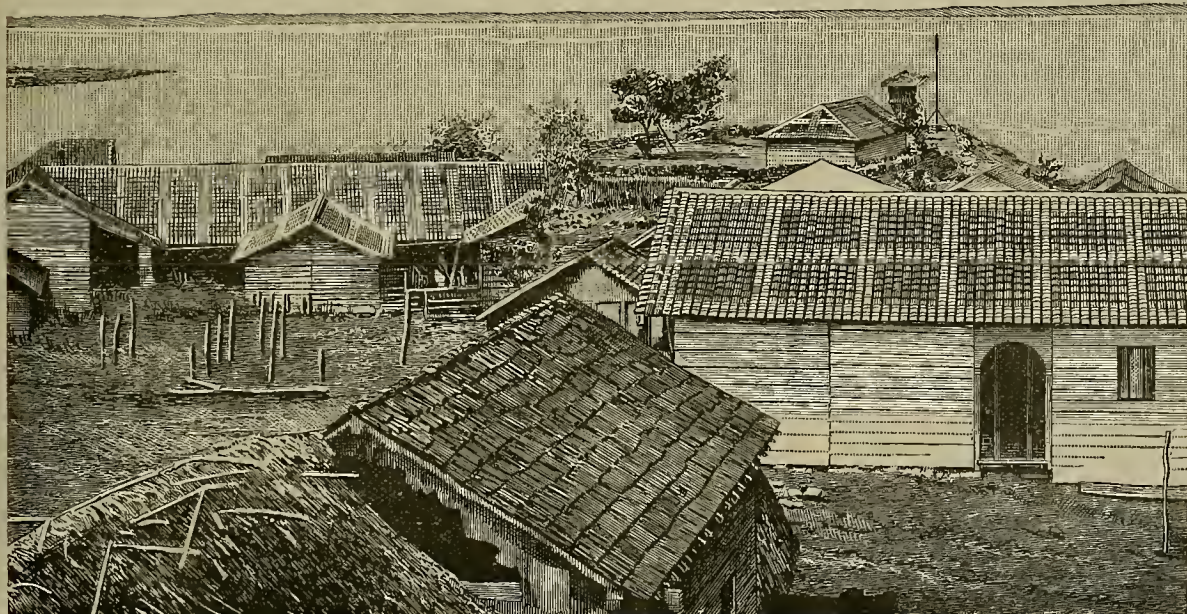
America, the Pacific Slope States, Australia and many other points. Undoubtedly a very large tonnage of coal from Alabama would soon pass through to points on the Pacific. The entire grain trade of California, Oregon and Washington would pass through the canal. As to new commerce in the lumber trade from Puget sound, it would increase to proportions hardly to be realized at present.

W. L. Merry of this city says there need be no apprehension about a tonnage sufficient to pay a handsome interest on the investment, steadily increasing annually. The Nicaragua canal will do more to increase the American merchant marine than all the other propositions now before the country. The company is an American one, and we intend to keep control of the great enterprise in America, where it belongs.

On this page of the PRESS is given a sketch of Lake Nicaragua from Fort San Carlos. This great lake has a surface area of 2600 square miles.

The Bodie Miner says that while there is no reason to believe there will be anything like an active boom in our mining industry, there is every reason to think that considerable mining and other business will be transacted in Mono county this summer.

THERE are two Huntington roller-mills now at work in the mines of the Golden Ox mountains, China.



SKETCH OF LAKE NICARAGUA FROM FORT SAN CARLOS.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

The Mines of Old Tuolumne.

[From Our Own Correspondent.]

EDITORS PRESS:—Tuolumne's hills are decked in green, her orchards white with fragrant blossoms. Nature is clothed in her spring suit and looking her best. In the towns there is an air of desolation. The long-continued storms of the season have caused the closing down of the mills and mines of almost the entire county. Some are just starting up, and with favorable weather the next 60 days will see everything moving with its old-time speed and the air resounding with the inspiring clatter of the stamps.

Quartz Mountain.

The Heeslep mill is running on custom rock. The owners of the Dutch mine have purchased ten stamps of the old Patterson mill and will put in the Morris canvas tables for concentrating.

Whisky Hill.

Now called Jintown, is still enjoying its winter nap. In this vicinity are large bodies of low-grade ores, which rumor has it Messrs. Hayward & Hobart are gradually securing, all on the mother lode.

Tuttlestown.

The machinery of the Patterson mine and hoist has all been taken out and is offered for sale. This mill is running on small lots of custom rock from the veins worked by the pocket miners of Jackass Mountain. The Atlas is down 100 feet by shaft and drift of 200 feet on a vein running from 1 to 20 feet of ore averaging \$4 a ton in free gold.

Sumnerville.

The Eureka Consolidated, better known as "The Old Dead Horse," is pounding away on their four-foot vein of \$6 ore. The Morris canvas tables have been put in to save the concentrates. The Albany is at rest. Dr. Walker, the owner, states that "some parties are trying very hard to make me believe that I ought to give it to them for \$50,000."

The Buchanan.

The mill has just begun dropping the stamps. Mr. Davis has in contemplation the remodeling of the power system this season and the improvement of the entire plant.

Cherokee.

This camp, with its high-grade ore, is awaiting the coming of settled weather. While the veins are not large, the ore is high in grade and the shoots of sufficient length to make the veins profitable.

Soulsbyville.

The Old Soulsby is still resting on her laurels. Mr. W. Sharwood, who is now the owner of the Soulsby, is confident that the vast extent of unexplored territory, still virgin, in the Soulsby, with the necessary capital, could easily be developed from the old shaft, and without doubt ore equal in quantity and quality with that which made the Soulsby famous in the past, be discovered.

At the Carrie the shaft is going down.

The Black Oak was sold by the sheriff, and the purchasers are taking out the water. The owners have their time to recover the property. Why this mine with a long shoot on a large vein of \$24 rock, with a complete steam and water power mill, should fall into the hands of the sheriff, is one of those things "that no fellow can find out," but certainly points to some gross fault in the management.

Columbia.

A few Chinamen are ground-sluing, and the usual number of pocket miners are making average wages in their mines. To the north, the Keltz, the property of W. Sharwood, is being vigorously prospected. The tunnel is now in 300 feet on a vein running from two to five feet of ore milling \$12.

At the Mary Ellen the tunnel is now in 200 feet on a vein running from one to four feet, the last ore milled going \$24.50 a ton. The five-stamp mill is now hung up. It is reported that an English company will shortly take hold of this mine and equip it in first-class shape.

Sonora.

The superintendent, Mr. E. Loftus, is getting the ores of the Golden Gate under control. In fact it may be said to have passed through the experimental stage and settled down to an assured success. The Boss process was employed, but while it worked the ores up to a high percentage, the plant could not handle the mill's output. At present the ores are crushed wet, the sulphurets caught on corduroy Frue belt, and the slimes concentrated by Morris canvas tables placed below the Frues. The concentrates are sold to the Maltman Chlorination Works of Sonora.

The mill is of 10 stamps of 950 pounds each, crushing 2½ tons to the stamp through a 40-mesh screen. The ores are almost entirely sulphurets, the average being high in grade, while the gold is as high as 990 fine.

Mr. Loftus has just completed a 60-light electric plant for the mine and mill. The shaft on the mine is down 300 feet on a vein that in places is 12 feet in width. Both mine and mill are run by water-power. The mill-power proves what can be done with a low head of

water by use of the Pelton wheels. Mr. Loftus has brought in the free water of a neighboring stream, and with but 30 feet of pressure, by means of three nozzles playing on a 6-foot Pelton wheel, secured power to drive all the machinery of the mill. The wheel is 600 feet distant from the mill, power being conveyed by wire cable. Mr. W. J. Sharwood is employed as assayer, and promises to, in time, equal his father in ability as a mining-man. The mine has now every appearance of being on the road to success, and the owners can congratulate themselves that Mr. Loftus has brought them safely through their experimental stage to the present one of assured success.

San Guleappa.

This mine is now the property of ex-Gov. Perkins, R. A. McDonald, A. Halsey and Captain Griffith, who also have the bond on the New Albany. At the San Guleappa the shaft is down 136 feet on a vein running from ten inches to two feet. The ore is almost entirely sulphurets, the gold exceptionally high, running over 990 fine. At present the work is altogether of a developing character, the ore extracted being very high in grade.

The Bonanza.

The superintendent and fortunate part owner, Mr. Oliver, has put down a shaft 170 feet to crosscut the vein. His neural luck (ability) has been rewarded, and the bottom of the shaft is in the black metallic slates which accompany the gold-bearing portion of the vein. By the time this reaches the readers of the PRESS, the vein will have been crosscut, and without a doubt the owners will again be in bonanza. Of this they are confident, one of the owners, Mr. Rogers, assuring me that he was just as confident that they would find it as rich as in the past, as he was in the second coming of Christ.

The PRESS illustrated this bonanza about a year ago. To those who were not then readers of the PRESS I would repeat that the vein is what miners would term a porphyry dyke inclosed in slate walls. The slate is of the brown-black variety, except where the pockets occur. Here it is of the black metallic. The dyke or vein has small seams of quartz running through and with the course of the vein, these quartz seams occurring near both walls and in the center. Crossing the vein at different angles are iron seams called by the miners "gold seams." On this vein, where the walls are of metallic slates, near the footwall, at the crossings of the "gold seams" with the quartz stringers, the gold occurs. This black slate is followed and the gold seams do not fail to lead to the gold. Now that the lessees are down and all of the former difficulties overcome, the PRESS will be called upon each week to chronicle the unheard-of yields of this "the old Bonanza."

Maltman Chlorination Works.

The mine-owners of Tuolumne have long labored under the expense of shipping their concentrates by wagon and rail to distant points for treatment. Mr. Maltman, with his chlorinating plant, has been a much-needed and now duly appreciated convenience. These works have at present a capacity of 2½ tons a day. A rock-breaker and Austin pulverizer, run by Pelton wheel, are used for sampling ores. This season a complete ten-stamp custom mill will be put in. The plant is just at the edge of the town of Sonora and is assured of a steady supply of concentrates from the sulphurets mines of the vicinity. "Old Tuolumne," like "Old Virginia," "never tires," and such success marks a steady advance in her mining prosperity.

E. H. SCHAEFFLE.

Kern County Mines.

EDITORS PRESS:—After a decade of desolations, quartz mining may be said to be a growing industry in this section. The amount of gold extracted from the rock during the last year, in this vicinity, was double that of the year before.

The Robison mine, discovered about two years ago, and owned and worked by three brothers, has yielded during the last year over \$7000. Nearly all of this was clear gain, as only about 100 days' work was bled, and the rock was crushed in a water-power crusher belonging to the mine. Still another fact is that no stoping was done, and all this quartz was obtained from development work. A level tunnel was run along the lode 130 feet, and a shaft sunk on the dip of the lode a like distance—all in good rock with a vein averaging 16 inches. The best rock uncovered is in the bottom of the shaft.

The Glenn Olive is also a new mine which has yielded \$15,000 the last year, but a number of men have been employed at wages on this mine.

These two mines, with their machinery exempt, would sell to-day for enough to pay wages for every day's work done incident to mining, in this section, for the last two years.

The old pioneer miner, J. W. Sumner, still hammers away with a little five-stamp water-power battery. He has taken out \$9100 during the last year.

Some eight or ten other quartz enterprises have been worked in the vicinity with varying success, and it may be concluded that the yield of gold bullion for Kern county for the past year will not fall below \$100,000.

There has also been some prospecting for silver, and two mines were struck on Cook's

Peak, in Silverado district, six miles south of Kernville, which promised good for wages in argentiferous galena; but as this parties were prospecting only to sell, such a mine was desisted of no value.

Another mine has been struck on Erskine creek, 12 miles south of Kernville, which presents some peculiar features. The ore is in round or kidney-shaped masses, ranging from the size of an egg to 100 pounds in weight, of a lead-gray color, inclining to silver-whites, of conchoidal fracture; specific gravity perhaps nine, and hardness about that of galena. About two tons of this ore have been taken away for samples.

STEPHEN BARTON.

Kernville, Kern Co.

Comstock Ore and Bullion.

The following are the statements of the ore and bullion produced by the several Comstock mines mentioned below for the quarter ended March 31, 1890. Statements of the Alta, Cholara and Justice product have not yet been filed with the Assessor of Storey county, Nevada:

Con. Cal. and Virginia.—Produced 25,680 tons of ore, yielding bullion valued at \$469,574.66; total cost of extraction, \$198,656.40; cost of reduction, including transportation, \$179,760; total cost of production, \$378,416.40; yield in bullion per ton, \$18.10; yield above cost of production, \$91,158.60. Bullion tax, \$4557.93.

Challenge.—Produced 330 tons of ore, yielding bullion valued at \$5024.10; total cost of extraction, transportation and reduction, \$11,195.15; cost of production above yield, \$6171.15; yield in bullion per ton, \$15.50.

Confidence.—Produced 191 tons of ore, yielding bullion valued at \$2891.89; total cost of extraction, transportation and reduction, \$11,126.23; cost of production above yield, \$8234.34.

Con. Imperial.—Produced 212 tons of ore, yielding bullion valued at \$3217.60; total cost of extraction, transportation and reduction, \$21,881.45; cost of production above yield, \$18,663.85.

Hale and Norcross.—Produced 5859 tons of ore, yielding bullion valued at \$67,668.93; total cost of extraction, transportation and reduction, \$104,359.77; cost of production above yield, \$36,690.79; yield in bullion per ton, \$11.90.

Overman.—Produced 1670 tons of ore, yielding bullion valued at \$22,597.10; cost of extraction, \$15,224.22; transportation, \$1670; reduction, \$10,020; total cost, \$17,914.22; yield above cost of production, \$4682.97; bullion tax, \$234.14.

Savage.—Produced 4570 tons of ore, yielding bullion valued at \$65,795.76; total cost of extraction, transportation and reduction, \$30,718.68; cost of production above yield, \$14,922.92; yield in bullion per ton, \$18.16.

Yellow Jacket.—Produced 3608 tons of ore, yielding bullion valued at \$33,999.62; cost of extraction, \$29,877.57; transportation, \$3608; cost of reduction, \$18,000.80; total cost of production, \$51,526.37; yield above cost of production, \$2466.25; bullion tax, \$123.31.

THE COMSTOCK LODE.—The general outlook on the lode is favorable without being exciting. It promises good returns for regular working, but just at present nothing is in sight on which to found a boom. In several leading mines, prospecting drifts are advancing in a fertile formation with some metal showing, and in these there is a chance for the "unexpected" to happen. The reopening of the deep levels of the Gold Hill mines will add to the average solidity of the Comstock situation, whether or not any new development shall be made that will result in speculative movements. This, however, will be a matter that will not in any way materially influence the price of mining shares until some time next fall. In the meantime the Comstock will undoubtedly enjoy a season of solid prosperity, as the indications at present are that the mills will be able to run nearly all summer; therefore the miners will be able to get in about two months' extra work, which means about half a million more than usual distributed among our people.

THE IRON AND STEEL COMPANY.—A meeting of the stockholders of the California Iron and Steel Company was held last week for the purpose of getting the stockholders to authorize the Board of Directors to issue bonds to the amount of \$100,000, to be secured by a mortgage upon the real estate of the company, to run five years at six per cent interest, the money to be used to pay off the liabilities of the company. The authority asked for was given, and the old bondholders will be paid \$72,000, and the balance of \$18,000 will be used to pay off all other outstanding indebtedness and leave the property, which is valued at \$350,000, free. This will put an end to litigation, which has hampered the company for some time, and give it a fresh start.

CEDROS ISLAND MINING.—Advice from San Diego say: The Cedros Island Mining Co. has chartered the Carlos Pacheco to make regular trips between this point and the island, taking down supplies and returning with ore. The company already has four sailing vessels, mostly schooners, plying between the above points, but ore is not coming up as fast as it is taken out, and larger carrying facilities had to be secured. The ore is of high grade.

The Deep Gold Placers of California.

NUMBER V.

Written for the PRESS and Copyrighted 1890, by HENRY G. HANES, F. G. S. A., F. G. S. J.

Channel Filling—Minerals.

Other minerals besides quartz are found in the deep channels and in the hydraulic and shallow placers—some on the bedrock, some disseminated throughout the mass; but the quantity is extremely small as compared with the quartz and clay.

As far as my observation goes, the following comprise all the channel minerals:

Albite, augite, barite, chromite, clinnabar, corundum, diamond, galena, garnet, gold, graphite, gypsum, limonite, iridium, lead, lignite, limonite, magnetite, orthoclase, platinum, platiniridium, pyrite, pyroclastic, serpentine, stream tin, water, zircon.

None have sufficient economic value to be worth extracting except gold, for the sake of which the most stupendous operations have been undertaken and successfully prosecuted.

Albite (soda feldspar) is of rare occurrence in shallow placer mines, and is almost universally associated with other minerals in the form of pebbles. It is unknown in the deep placers.

Augite (silicate of lime, magnesia, iron, etc.) This mineral occurs as one of the constituents of certain lavas found in the form of boulders and pebbles in some shallow placers in California, notably in Black Hawk Canyon, San Bernardino county, with gold, copper and lead ore.

Barite (sulphate of barytes) has been observed at the Malakoff hydraulic mine, North Bloomfield, Nevada county. It appears only in the cleanup in small rounded pebbles; it is not common. Other localities no doubt exist, for the mineral in veins is quite abundant in this State and others on the Pacific Coast.

Chromite (chromic iron) generally in a finely divided state constitutes a portion of the concentrates which accumulate in the sluices and undercurrents in numerous hydraulic mines. It is a common mineral in California in serpentine, which rock is often deeply cut by the auriferous channels.

Cinnabar (sulphide of mercury).—This mineral is found, but rarely, as a scarlet powder in the cleanup washings made in shallow placer mines. Cinnabar is a common mineral in the Coast Range of mountains, but is unknown in place on the western slope of the higher Sierra Nevada.

Corundum (impure alumina) is known to occur in the drift in the San Francisco Pass (Richthofen), and is said to be found in cleanup placer mines in the southern part of the State. Fine specimens resembling the rolled masses brought from India are found in the placer mines in Stanley Basin, Custer county, Idaho.

Diamond (crystallized carbon). Diamonds have been found in at least five counties in California, and always in mining for gold. There has never been any systematic search for them, but it is the opinion of some miners that more could be obtained if sought. The noted localities are near Volcano in Amador county; Spring Valley hydraulic mine near Cherokee, Butte county; near Placerville, El Dorado county; and in the platinum sands of the Trinity river, Trinity county.

Galena (sulphide of lead). Pebbles and boulders of vein matter containing galena are sometimes found even in the deep placers, but they are of rare occurrence. Some of the quartz mines now being worked at a lower altitude contain this mineral in considerable abundance, which was probably the case in the veins that once existed in the eroded bedrocks, but being of a fragile nature, the galena must have been lost to view or changed to other minerals.

Garnet (anhydrous silicate of sundry bases). Garnets are often found in the channel filling; in fact it is hardly possible to find close concentrates without them. The species have never been determined; they are generally very small. They were detected by me in the Ohio glacial drift, as shown elsewhere.

Gold.—Although this is the most valuable mineral found in the channel filling, the quantity is much smaller, bulk for bulk, than most of the others. It is not generally known how very small the quantity of gold is, as compared with the amount of earthy matter in the channels.

The early miner gathered the gold which had been concentrated by long-continued geological forces. The drift miner does the same thing but in a different manner, and not without the investment of a large capital in money and labor. He takes the coarse gold only, found on or near the bedrock, but rejects, as worthless, channel matter quite as rich in the precious metal as the average worked by the hydraulic miner.

The following figures will convey to the mind of the reader some idea of the vast amount of labor and capital invested in gold mining in California, and how small the per cent of yield. Taking the North Bloomfield hydraulic mine as a type, and assuming that the drift mines are no richer, if the entire channel filling is included in the estimate, it may be shown from the official reports of the company that the total cubic yards washed from the top and bottom gravel from Nov. 29, 1876, to Oct. 13,

1877, was 2,293,930. The yield of gold was 12.7 cents per cubic yard, or \$291,329.11.

Each cubic yard of this gravel averaged 1.8 tons in weight (2,293,930 ÷ 1.8 = 2000 = 825,145,000 pounds avoirdupois). One pound of pure gold being worth \$301.46, therefore (\$291,329.11 ÷ \$301.46 = 966.3 pounds of pure gold), then the pounds of gravel being divided by the pounds of gold, we find that 8,546,153 parts of gravel must be worked to obtain one part of gold.

Genesis and Placement.

There has been much controversy among geologists as to the genesis of gold, or rather its placement in the quartz vein matter, which is regarded by miners as "the mother of gold." The most rational hypothesis to my mind is that gold which during the gaseous state of the earth gravitated to or near its center, has been brought to the surface mechanically by upheaval and eruption of plutonic rocks; these being disintegrated and comminuted, it was wafted to ancient seas and became one of the constituents of sedimentary rocks, now the so-called bedrocks. Solfataric action subsequently filled accidental fissures and at the same time deposited the gold gathered from the generally sedimentary wall rocks.

Notwithstanding the opinion of others, my own belief is, that nuggets as such, freed from the vein matter in which they once lay, do not grow, but on the contrary diminish in size until wholly changed to float gold, which is borne again to the sea.

I was once asked by a person holding a different opinion why it was that we find in placers larger masses (nuggets) of gold than we ever do in quartz mines. My reply was that the denudation which freed the placer gold from the quartz was so far greater than that by any mining operation, that the chances of the occurrence of such masses is in the former case greatly multiplied.

John Hutchinson ("State of Nature or Instincts, with a Treatise on Mining and Observations in 1706, London, 1749") expressed the opinion that mineral veins were filled from the wall rocks in the following words: Fol. 189. "As Spar and Lime Stone occurs Powder in Grit, Talk called by several names Cockle, Blackjack &c in several Sorts of Stone and always in one or both of the Sides or Strata which include the Vein at the same Level or at different Depths such are found in the vein and are Demonstrations that as that Matter came with the Ore that Matter and the Ore came out of the next adjoining Strata."

A further perusal of this remarkable work would be of interest to those who think these ideas modern.

William Wallace ("The Laws which Regulate the Deposition of Lead Ores in Veins, London, 1861,") wrote an able work on this subject, and I believe that most geologists now admit the conveyance of metallic minerals in solution, and their placement in veins.

When we have expressed the opinion that the gold in the placers came mostly from quartz veins, it may be asked, How came the gold in the quartz? In reply to this supposititious question, the field will broaden and we shall be compelled to admit that further statement must be conjectural.

If we express an opinion that gold was deposited in veins, by infiltration from sediments changing to rocks, the question will follow, Whence the gold in the sediment? and the only reply that can be made will be that it was probably in the eruptive rocks from which the sediments were formed, and that it was brought up by them from the interior of the earth. It is sufficient for our present purpose to assume that the direct source of the gold in the deep placers was the quartz veins and the pyrites in the slate bedrock.

Geologists seventy-five years ago generally believed that thermal springs owed their heat to volcanic agencies, and supported their opinion by calling attention to the numerous earthquakes.

Solfataras were called fumavols by Pinkerton (Petrology, London, 1800), or pseudo-volcanoes and volcanello. He describes spontaneous combustion of peat and lignite. The mountain of Crenasao was burning in the year 1400, the hill of Fontaynes took fire in 1763, the miners having been in the habit of taking out the large coal and leaving the slack, which fermented and ignited. The same thing happened near Reno in Nevada a few years ago.

The solfataric theory of the filling of fissures in the surface rocks of the earth may be stated, in general terms, as follows:

An accidental crack or fissure is caused by upheaval, earthquake, plication, or other manifestation of contraction, resulting from the gradual cooling of the planet. When a fissure was made, the hot water, now become a stronger mineral solvent, would not only take up matter in solution, but would bring together chemical substances; some having an affinity while others were antagonistic. A sort of natural chemical laboratory would thus be established, causing endless changes and resulting in the gradual filling of the vein with such elements and compounds as were within the reach of the collecting forces.

It must be clear that no gold could by any possibility be deposited in a mineral vein unless the metal existed somewhere in the rocks within the influence of the local chemical action. This would be true of all the other minerals and metals. In all parts of the earth's surface, veins have been filled, are being filled, and will be filled in the future; but if the minerals de-

posited are valueless, they pass without notice. In countries where gold, silver and other desirable metals are found, nature has simply collected these accidentally disseminated through the rocks, and condensed them in the mineral veins, where we discover and extract them. In considering this subject, no account must be taken of time, for these changes are slow. A vein may be filled, the surface denuded, and the metals scattered, oxidized, and combined with others, scores of times; new fissures formed and the metals, to a certain extent, collected again and again, and deposited in new forms.

This may at the present time be observed in active progress at Steamboat Springs, Nevada; at the Gayars; at the Mod Volcanoes in San Diego county; in Cozo District, Inyo county; at the Redington quicksilver mine, Lake county; at Sulphur Creek, Colusa county; at Sulphur Bank, Lake county; and other localities. Dr. Oxland, Prof. Joseph L. Conte, Prof. J. D. Whitney, and other writers in our State and elsewhere have called attention to these phenomena.

There is a continuous mineral-bearing formation in California, which extends through the entire State. It is somewhat hypothetical, and while known as "the great mother lode," and credited with producing all or nearly all the gold in the placers, it is now certain that this is a mistake, and that the true source of the precious metal in the deep placers was the numerous quartz veins and pyrite crystals in the underlying bedrocks of the high Sierra. I was an advocate of the mother-lode theory until observation caused me to change my opinion. It is now a well-established fact that gold occurs in the chlorite and talcose schists of the bedrocks themselves as well as in the quartz veins, rarely free, but generally in cubes of ilmenite, pseudomorphs after pyrite, sometimes half changed only. Gold released from such a mechanical combination is so finely divided, as a rule, that it would easily be washed away as soon as freed, and in my opinion it could not form nuggets or aggregations without being placed in veins by the natural process described.

If such crystals were crushed and in part roasted, the gold could be easily collected by the chlorination process; but they are so scattered through the rocks that they could not be separated without crushing the whole mass, which would necessitate subsequent concentration—an operation too expensive to be profitable.

It is my opinion that it may eventually be found worth while to crush the quartz boulders in the gravels. It is certainly cheaper to collect these than to sink deep and extensive shafts and mine this quartz in place. That they contain gold, may be safely assumed, and with cheaper labor, water-power, and the increased value of the bullion product, it may be found worth while to make the experiment on a large scale, much as the Alaskan gold mines are now being worked.

Distribution of Gold.

While most of the coarser gold in the drift mines lies on the bedrock, that in a finer condition is disseminated through the entire channel filling to the lava roof. As the upper gravels are too poor to be worked by any known process other than the hydraulic, millions of dollars worth of gold will for the present remain beyond the reach of man. The gold-miners make a distinction between the rich stratum and the poor gravels above. They have in use the term "pay dirt" or "pay gravel," which refers to earthy matter met with in their mining operations which contains gold enough to return the expenses incurred in its extraction and leave a margin of profit, be it great or small. When the yield is sufficient to allow all those engaged what they could earn if employed elsewhere by the day, they say that the claim "pays wages." They estimate values in prospecting by the amount of gold contained in a common miner's pan in a single operation of washing the pan full of earthy matter, and calculate with singular accuracy, "five cents to the pan," or any number of cents, as the case may be. Any particle of gold remaining in the pan, regardless of size, is called a color. By long practice, they judge the value of each color by the eye, sufficiently near the truth to know if the prospect will pay to wash on a large scale or not. They are too wise to trust to a few such tests, but before engaging in any extensive operation, spend some time in such a system of prospecting and average up the results with the greatest care.

Physical Condition of the Gold.

There is a marked difference between the condition of the gold in the deep placers and that found far from its source. This fact is a strong argument in favor of the glacial theory.

Gold is always found in the deep placers in a metallic state; in fact there is no mineral in which gold has been proved to exist in any other condition. In the so-called tellurides it is my opinion that the gold is with the tellurium a mechanical mixture. We believe that gold is conveyed in solution and deposited in vein matter, yet it is not impossible that in some, if not in all the cases, the gold may remain metallic, but so finely divided that it has some of the properties of a fluid. Gold in some of the pyrites crystals mentioned is in such a condition.

If gold is precipitated from a very weak solution by protosulphate of iron, some of the metallo precipitate will remain in suspension for hours, if not for days, and a portion will float on the surface of the solution in a golden skim.

After a majority of the gold has settled, the liquor will still retain for sometime a purplish tinge from the gold in suspension. Some gold exists in all the placers so fine that it will visibly float and will leave the pan in spite of the best endeavors of the most skillful panner. This fact is well known among miners and is the frequent theme of conversation. To save this float gold, many processes and varieties of apparatus have been invented, but the float gold eludes them all.

It is not usual to see gold in quartz howlers, although it is almost certain that it all came from just such quartz veins as those now being worked in various parts of the State. A few instances of howlers rich in gold have come to my notice. A specimen was shown to me some years ago by Dr. Robert Bowie, found in the Homeward Bound placer mine, near Iowa Hill, Placer county, on the bedrock; it was auriferous quartz showing the vein origin of placer gold. A large and very rich milk-white howler was found at the Polar Star hydraulic mine near Dutch Flat in Placer county, which I examined. The gold was bright and imbedded in the quartz. The howler was rounded like others in the slalom, and it is fair to assume that if this was from a vein, the others were so also. A howler from the Darbee drift mine, rich in gold, was of the characteristic blue quartz peculiar to the deep placers.

There is a distinctive character to the gold from different mines, its fineness also differing. The word fineness as applied to gold has a double meaning—mechanical division and the quantity of foreign matter alloyed in it. The latter sense is intended here. Gold in the deep placers has no luster, many of the grains have no appearance of gold, but more resemble magnetic sands. On examination, this is found to be due to a coating which sometimes partly and sometimes wholly envelops the metal. An inexperienced person would never suspect the real character of this coated or "rusty" gold, as it is called by the California miner.

It is fortunate that all the gold is not in this condition, for when so coated it cannot be amalgamated and is wholly or in part lost. Certain writers on metallurgy in the Eastern States and Europe have denied the existence of rusty or coated gold, and have implied that we are mistaken, because they have not seen it in this condition. If they or others interested in this subject should visit San Francisco, I shall be pleased to show them specimens from various localities, the examination of which cannot fail to convince them.

Several gentlemen in San Francisco have made a study of this rusty gold for years, among whom I may mention Melville Attwood, F. G. S., and Mr. A. B. Paul. Both have published papers on this subject which are of great interest.

Miners in California at an early date discovered that some placer gold was clean and of a yellow color, with highly metallic luster, while in others it was dark-colored, sometimes quite black and wholly unlike gold, except that it "stayed in the pan," flattened under the hammer, and was not attracted by the magnet. When cut with a knife, or melted before the blowpipe, it was found to be gold, and displayed the characteristic color.

While the former amalgamated perfectly, the latter was wholly indifferent to mercury and could be washed from a pan of quicksilver by a moderate force of water in motion. While these facts were well known, the reasons were not, and although the miners were well aware that a large portion of gold in the first operation passed through the sluices, undercurrents, grizzlies and other appliances, they were helpless to prevent it; but after being exposed to atmospheric influences for a time, it became cleaner, and a second portion could be obtained by another washing. At Red Gulch in El Dorado county, near where the first placer mines were discovered in 1848, it has been found profitable to work the placers at least seven times over. It is from this circumstance that the idea obtains among certain miners that the gold is renewed, or that it "grows again," as expressed by them. This is said to be a common opinion among Mexican miners. It was noticed that the gold obtained from the quartz mines was never rusty, and that river gold was much less so than that in the deep placers. These considerations led me as early as 1880 to commence a series of experiments and physical and chemical examinations of placer gold, and to collect specimens from as many localities as possible, which I have continued to the present time.

In that year I called attention to this very interesting and important subject in a paper read before the San Francisco Microscopical Society, which was published in the First Annual Report of the State Mineralogist, 1881; and a second paper which I reproduce here because it contains certain facts that have a bearing on the present discussion:

"Some years ago I read a paper, before this society on 'Rusty Gold,' giving the result of my experiments and observations up to that time. I have since continued the study of placer gold in this abnormal condition, which has led to the discovery of important facts bearing on the production of gold in California; and as these discoveries must to a great extent have remained unknown were it not for the microscope, I consider this society the proper medium through which to make them public.

"For many months I have conducted a series of experiments in my private laboratory on placer gold from numerous localities in the

State. I have also studied the behavior of gold in the presence of mercury under all conditions I could think of, the results of which have been carefully recorded and preserved for publication, the most important of which may be summed up as follows:

"When perfectly clean gold is exposed to the action of pure quicksilver, it is instantly seized by the latter and coated with amalgam. The accident of gold being alloyed with other metals in nature does not impair its affinity for mercury, if the surface is made bright mechanically by filing or scraping.

"Much of the native gold found in placer mines, apparently clean, is slightly tarnished by the oxidizing or mineralizing of its alloy, in which case it amalgamates with difficulty. I have failed in every instance to find gold in quartz in this condition, although intelligent miners have informed me that they have sometimes observed it in their experience. A large proportion of the placer gold found in California is wholly or partly coated with silica, cemented by sesquioxide of iron, as stated in my former paper.

"When wholly coated, it is perfectly inert to the action of mercury. One might as well put gold into a glass bottle and attempt to amalgamate it from the outside. When partly coated, the exposed parts become amalgamated; to that extent only is the gold held by the mercury. If rusty gold is digested in hydrochloric acid, the iron is dissolved and a slight mechanical force then serves to detach the silica, when amalgamation takes place without difficulty. There is no hope of being able to free gold from this coating during the few hours it is exposed to the forces employed in the well-known hydraulic process. When clean gold amalgamates, it does not become homogeneous, but the amalgam forms only on the surface. I have had a piece of placer gold in mercury standing in my laboratory for several months, during which time I have frequently triturated it, sometimes several times a day, and it is not yet dissolved; still in pouring it from one vessel to another the mercury flows freely without showing the gold, but I can at any time fish it up with my finger. Gold so amalgamated could not, in the process of placer washing, escape from the mercury; but coated gold under the same circumstances will float on the surface of the quicksilver, and any slight force will detach it.

"The coating of gold may be limited, as found by experiment. A piece of pure gold, after annealing, was placed in pure mercury, and it instantly became amalgamated. Another portion, exactly similar, was hammered on a perfectly clean and polished anvil, and placed in mercury like the first. It became as quickly amalgamated. Pure quartz was then ground to a powder and sifted on the anvil in a thin stratum. A third piece of the same gold was then laid on the powdered quartz, struck several times with the hammer, turned over, placed on a different spot, and again hammered. The gold was then examined under the microscope and seen to resemble the coated gold found in the placers, the quartz particles being imbedded in its surface. When placed in mercury and allowed to remain for some time with frequent agitation, it floated on the surface and seemed to be wholly unacted upon; but when placed under the microscope it was found that the mercury had attacked the gold through the small interstices, but only to a very limited extent. The gold was then placed on an iron slab and gently rubbed with an iron muller, by which treatment it became more perfectly coated, and was now an exact imitation of the natural coated gold, minus the iron cement. In the natural coating of placer gold, I consider the cementing to be a secondary process, and the sesquioxide of iron to result from the decomposing pyrite, which was abundant in the quartz veins that yielded the gold."

"The only way that rusty gold can be collected is by taking advantage of its great specific gravity independent of mercury. In hydraulic mining it becomes concentrated like the zircons and other heavy minerals, but it has often been thrown away because it was not recognized as gold. There is no evading the fact that a much larger quantity of gold is lost in California than is generally admitted. It is my opinion that fully one-half escapes the miner. This condition of gold is not confined to California. I have in my collection rusty gold from many localities, both in America and elsewhere.

I am of the opinion that the gold became coated under the glacial ice while the erosion of the rocks was in progress. The iron cement, so common in the deep placers, results from the decomposition of pyrites without a reasonable doubt; and the "brickbat," both here and in Georgia, has in my opinion the same origin. That the gold is battered and rolled, cannot be doubted by a careful observer. A specimen given to me by Mr. D. Brabban of Laporte is rolled up like a miniature cigar, exactly like the rolls which result from crushing rich gold quartz on an iron slab under an iron muller.

THE new reservoir of the Contra Costa Water Company is distant 2½ miles in an air line from the City Hall. It will be completed before the next rainy season. About 130 men are now engaged on the work of excavation. Many more will be employed shortly. The reservoir and pipe connections will cost \$350,000.

THE soda famine in England is likely to start up operations on the shores of Great Salt Lake.

MINING SUMMARY.

The following is mostly condensed from journals published in this interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

AMADOR GOLD MINE.—*Ledger*, April 26: About 20 miners were started to work last Monday, operating three machine drills, preparing to open stopes. It is understood that the force will be considerably increased about the first of next month. The work now being done is with the view of getting the mill started at the earliest possible moment. The rock-breaker is not up yet; but the roads are rapidly getting in shape to admit of an effort being made in that direction at an early date.

GARDNER.—This property continues to develop very satisfactorily. The ore that has lately been taken from the tunnel shows abundance of sulphurets and some free gold. Robert Stevenson and two other interested parties from San Francisco paid a visit to the claim a few days ago, and were much pleased with the outlook. The rock in sight is said to be sufficient to keep a large mill running for years. There is little doubt that the parties will redeem the bond when it becomes due, if not before. There is renewed talk of building a mill this summer.

NOTES.—The Plymouth Consolidated is running 20 stamps steadily. At the New London, things are moving along very steadily and quietly. Several cleanups have been made, but the yield is not generally known. There is little reason to doubt, however, that the property is paying very well. Reeves mill, between the Cosmopolitan and New London, is also kept moving to its full capacity, but the surrender of the ore is likewise kept locked up in the breasts of the few who are in the secret. At the Cosmopolitan two tunnels are being driven in a northerly direction.

Calaveras.

GOLD BY THE POUND.—*Prospect*, May 23: Judge Ira H. Reed was the recipient from his mine at Central Hill on Monday last of a pan of coarse gold weighing 123 ounces. One nugget was valued at \$18 and dozens ran from \$1.50 to \$2.50 each. The total value was \$2149.40.

WEST POINT.—*Cor. Calaveras Chronicle*, April 26: In order to show outside capitalists and mining men the resources of the West Point mining district, I will mention some of the properties. Starting from the Kelt mine, owned by Peasley & Co., who have a ledge of high-grade ore about four feet in width, running from \$15 to \$75 per ton, we go south about one mile, when we come to the Hall mine, from which there has been taken thousands of dollars. Next come the John Henry, Modoc, Wide West, Tucker, Bartolia, and the Blazing Star, which is now in operation again. Then there is the Tom Payne, which is taking out some very rich ore, as also the old Lockwood, which has turned out fabulous wealth and is still good, with a 10-stamp mill and a full force of hands. Then comes the Scorpion, a valuable piece of mining property, which is bonded to San Francisco parties. There is a five-foot ledge of good ore and a five-stamp mill. I may as well embrace one or two of our poorest mines, such as the Champion, which has turned out a small mint of money, and to-day would be one of the best claims in the State if properly worked. Then going from the Champion in a northwesterly direction about two miles, we come to what I predict to be one of the richest mines in the State, known as the Lone Star, owned by Eastern capitalists and superintended by G. L. Brown. The mine is worked through tunnels. I heard from good authority that in the lower tunnel, the ledge was over nine feet in width from the foot-wall to as far as they had worked toward the hanging-wall, the latter having not yet been reached. The ore is of a high grade and the lead is pronounced by good judges to be one of the richest and best in the country. The company has a 20-stamp mill which is kept running night and day. We are expecting to see the Riverside start up shortly. San Francisco parties are at present negotiating for the property. It is only a short distance from the Lone Star and is a good mine. The smelting works are in operation and are doing good work. They talk of enlarging the works right away. This is a good thing for the mines here, as it does away with shipping the ore to San Francisco, which takes nearly \$50 a ton off from the rock. They have a fine method of working sulphurets.

El Dorado.

GRIZZLY FLAT.—*Cor. Mountain Democrat*, April 25: The gravel miners are jubilant over the bountiful supply of water and are ground-slucing and hydraulicking. The quartz business is at a standstill and unless a move is soon made in this direction there will be a dull summer for Grizzly. There was some hope of the Melton starting up, and Mr. Stanley has been expected up for that purpose, but he does not put in an appearance. Unless he does, the mine is apt to lay idle. Capt. Smith, the veteran miner, is doing his best to develop something in the Mt. Pleasant. He is working the drifts day and night, and, as industry deserves success, I think he will have it. Companies cannot expect to make a success of a mine unless they work for it, and cannot sell unless something is in sight.

Nevada.

THE WASHINGTON MINE.—*Transcript*, April 27: Gratifying reports continue to come from the Washington mine at Ormonde. The 300-level south has gone into the pay chute a distance of 200 feet already and the face of it is in ore. The ledge fills the entire drift, showing it to be more than seven feet thick, and the quartz is the best yet found in the mine. Shaft No. 2 is being sunk and will be continued downward 300 feet before stopping. The capacity of the 20-stamp mill is to be increased to 20 stamps more, and new and heavy hoisting works are to be erected over the main shaft soon. A sawmill will also be put up this season by the company.

BANNER.—*Tidings*, April 25: The new shoot of rich ore in the Banner is 200 feet in length, extending from a point in the tunnel to beyond the lowest workings in the shaft. The outlook for a profitable, permanent mine is brighter now than ever before.

NORTH STAR.—*Supt. Abadie* informs us that the water will be out of the 1600 level by Monday evening and the mine cleared within three weeks. A full force of men is at work, that is, a force sufficiently large to keep the 40-stamp mill running steadily.

A TENDERFOOT'S MINE.—*Tidings*, April 26: A year or more ago a San Francisco printer named John Tilton, a young man, prospected for cinnabar at a point on the North Bloomfield road near Edwards' crossing. He was bamboozled into prospecting for cinnabar, but he struck a 90-foot ledge of quartz. Mr. Tilton was in town to-day looking for a mill of from two to five stamps, to place on his mine. He brought down 300 pounds of unassorted ore, which was crushed at Frank Johns' mill and yielded (according to Mr. Tilton) \$1 in gold and 150 pounds in sulphurets. From ten pounds of sulphurets obtained from 25 pounds of ore some months ago, Mr. Tilton says he received \$17.50, and the sulphurets now on hand is richer in appearance. The mine is known as the Cleveland and the workings on the ledge are in about four and one-half feet. The South Yuba river runs near by, thus providing water for power. If Tilton is not misleading himself (he declares that he has not tested his best ore and that the cleanup to-day was not complete), he evidently has a bonanza.

CROWN POINT MINE.—*Grass Valley Union*, April 26: Appearances are favorable for a strike of rich ore in the Crown Point mine, as within the last few days the slate cap that is found on the hanging-wall of the 400-foot level has been showing small stringers of quartz that are rich in free gold. No well-defined vein of quartz has yet been found, but it is likely to come in at any time from these indications. The ledge may come in on the hanging-wall, where it was found in the levels above, or it may be in the foot-wall that has not been opened upon yet. The stockholders in the new company are feeling much encouraged at the prospects.

EUREKA DISTRICT.—*Cor. Nevada Transcript*, April 26: In your paper of April 12th I saw a communication from J. T. Wickes, on mining in Washington district. In that letter he makes a statement that should be corrected. One would think by reading his letter that all the mines that he mentioned were in Washington district, when five of the quartz mines referred to are in Eureka district. Other correspondents from Ormonde and Washington to Nevada City papers have done the same thing. For the benefit of the Washington correspondent I will give the locality where those mines are situated, so all can refer to the map of Nevada county and see if they are writing about mines in Washington district. In section 35 are the Lucy, Rising Sun and Star mines. In section 34 are the Moore, Rainbow and Boston mines. The latter is owned by a company in San Francisco, and is in charge of Victor Fernbach, who contemplates building a mill on it as soon as he can get the machinery hauled in. They have good prospects in the mine. They worked a small force this winter. In sections 34 and 35 is the Baltic property. This mine has been idle the last year, owing to bad management, but there are prospects of its starting again this spring. In section 28 is the California. In section 21 are the Anchor, Erie, Dublin Bay and the IXL mines. The latter is owned by P. A. Campbell and a company of S. F., and is under the able management of Mr. Campbell. They work through a tunnel that runs in from the mill and that tunnel will give them 1000 feet depth on the ledge. They have had pay rock from the first blast. They will build an additional 20 stamps this summer. Mr. Campbell is now running the mill that he erected last fall. The ledge is 14 feet wide as far as they have run their tunnel, with prospects of being larger. In section 30 is situated the Spanish mine. There is also a belt of mining country north from the Baltic property. In section 22 is the Golden Ade, owned by parties in Sonoma county and under patent. This mine has good prospects. In section 15 are the Birchville, Iowa, Sweet and Blue Cloud. The three former were worked some years ago to water level and were good gold-producers. The Blue Cloud is a new mine that is opening up with good prospects. In section 16 are the Shepp and the Rocky Glen mines. The former is a small ledge but very rich, the last rock from it working \$54 per ton. The Rocky Glen is owned by the Hayward Co. There has been some hundreds of thousands of dollars taken out of this mine. It is the only mine in the district that has been sunk on below what could be tapped by tunnel. All of the mines mentioned are in township 18 N., Range 11 E., M. D. B. M. All of said township is in Eureka mining district. There are good roads connecting all the mines in the district with Graniteville. We have the best timbered and watered district in the State for mining purposes. We have two sawmills to supply all lumber that is required in the district.

Inyo.

DEFIANCE.—*Inyo Register*, April 26: Foreman Jas. McDonald has received instructions from P. Roddy, owner of the noted Defiance mine at Darwin, to push certain new exploitations in the mine to determine the extent of the known bodies of low-grade ore. This being determined, future operations involve the continuation of the Darwin water-works to the mine and probable placing of a rock-breaker, roller crushers and concentrators, the principle of which is being evolved out of the jigger process.

FISH SPRINGS.—McCarty's two arastras, near the old Bond place at Fish Springs, are running night and day. The ore assays in gold about \$20, and comes from the McCarty & Melone mine. Fuller & Irving are also with them. The mines are south of Fish Springs, across the spur of the Sierras which there crosses the valley.

UNION.—Work at the Union mine, Cerro Gordo, is being systematically shoved along. A Burleigh air-compressor and three Ingersoll drills are on the way to the mine, to drive on the 700 level of the new shaft for the Union ledge and for the continuation of the Santa Maria southward on the 387 level, under the Enterprise ground.

Placer.

THE MOORE MINE.—*Herald*, April 26: At the Moore mine they have started the steam pump, and expect to have the water out and be ready to commence extracting ore in a short time. This is one of the richest leads in the district. Heretofore the owners have done all the work that has been done. This year they expect to put on some extra men and work the mine on a more extensive scale.

THE HATHAWAY.—The Hathaway mine, south of Auburn ravine, a short distance below Ophir, G. F. Taylor, superintendent, is proving a substantial and profitable enterprise. They are working now about 40 men all told, and the 20-stamp mill is kept running constantly day and night. They are working now on the 250-foot level. The vein is

from two to three feet thick, all mill ore, and pays from \$8 to \$10 a ton. The mill crushes on an average about 40 tons a day. In addition to the free gold, they save about 1500 pounds of sulphurets a day, which assays from \$150 to \$200 a ton, and works from 90 to 95 per cent of its assay value.

THE VAN VATOR QUARTZ MINE.—Work is being vigorously prosecuted at the Van Vactor quartz mine, at Canada Hill. The great depth of snow materially delayed the erection of buildings, but the late fair weather overhead has enabled them to make excellent progress lately, and by the 15th of May all will be in readiness to start crushing ore. The almost insurmountable difficulties overcome by Mr. Van Vactor, the energetic young superintendent of the above mine, in the erection of the mill during the past severe winter amid snow from 25 to 30 feet deep, and in having everything in readiness to begin active operations so early in the season, reflects great credit on his administrative ability and demonstrates the possibility of mining to advantage during the severest winter in the high altitudes, when proper arrangements are made.

THE ECLIPSE.—Last summer a N. Y. Co. got possession of the old Eclipse quartz mine, located about two miles west of Auburn, and under the superintendency of J. B. Patterson, the former owner, has been busy at work ever since erecting hoisting works, a new mill and developing the mine. They have been delayed by the excessive rains of the past winter, but at this writing have everything running in good shape. The hoisting works and pump, 100 feet from the mill, are run by a 4-foot Pelton water-wheel, and are so complete in automatic appliances that one man receives the cars and attends to everything. The mill is one of the finest in the county. Between the hoisting works and the mill is an elevated railway, along which the cars are run and from which the ore is dumped into the large ore bin. The automatic appliances are here again so complete that the entire works of the mill are operated by one man. The machinery is all very perfect and works like a charm. The power for the mill is supplied by a 5-foot Pelton water-wheel. The company has expended for buildings and machinery about \$30,000. The vein varies in thickness from 20 inches to 4 feet, and is all mill rock. At the bottom of the main incline the ore is as good as any they have had, and a 60-foot drift extending on either side of the incline, at a depth of 250 feet, shows a strong vein and uniformly rich ore. When they started the mill they had nearly 300 tons of rock on hand, and expect with this start to keep the 10 stamps running constantly day and night. Seven hundred feet east of the present works a shaft has been sunk to a depth of 200 feet. A steam-hoisting plant is being put on this, and it will be connected to the mill by a track so arranged that the ore can be delivered at the mill by machinery. Connected with the works is an assay office which is conducted by Mr. J. W. Peck, who for several years was first assistant assayer at the U. S. Mint in San Francisco.

ECLIPSE.—*Placer Argus*, April 26: The new mill at the Eclipse mine is in operation, and flattering developments are being made in the mine.

San Diego.

GOLD KING AND QUEEN.—*Julian Sentinel*, April 26: T. W. Brooks, the mining expert, who visited Julian some time since to report on the Gold King and Queen and Cincinnati Belle mines, is again in the camp this week in company with Geo. Rhorer, president of the company, and Mr. Cushman and son, two of the directors. Their visit is for the purpose of perfecting plans for the extensive development of their fine properties.

Shasta.

REDUCTION WORKS.—*Redding Free Press*, April 26: Messrs. Parmlee, Good & Nort, mining men from Chicago, without saying much to any one, but upon a favorable report being made by Mr. Parmlee, who was here and investigated our mineral resources last winter, came to our city a week or so ago, and after negotiating for several pieces of property upon which to erect reduction works, finally purchased 16 lots in the Walden addition, below the works of Wm. Conant, which burned down last week, and commenced excavating for the purpose of erecting a building. Thursday the freight train from the north brought an engine and boiler and a pulverizer, which, as soon as the building is ready, will be placed in position. These men are making no great commotion, preferring to await the legitimate results of their enterprise; but sufficient is known to enable us to state that the plant is being erected for the purpose of dry crushing and concentrating the precious metals of all the ores found in this neighborhood, saving the free gold and freeing from the quartz the gold-bearing sulphurets. They do not propose to work these concentrates. The process is what is known as dry concentration. Their process has been tried successfully in Chicago, where they have a large plant, and they will be prepared to work the ores for so much a ton, or will purchase the ores outright.

OLD DIGGINGS DISTRICT.—*Redding Free Press*, April 26: The mining industry is progressing about as usual and the outlook is hopeful and encouraging. We do not join in the nonsensical "booming" of our mines as some districts do. There is a big future for quartz-mining in Shasta county, and there will be more prospecting this year than ever before, but any exaggeration or deliberate falsehood will hurt the county ten times more than it will do it good. The Hart & Fleming and Walker mills have been running very regular. Mr. Paul of the Calumet has returned and is getting ready to start up the mill. Pete Christenson is putting up a horse-power attachment to the cable transfer system of the Central mine connecting with Whitehouse switch across the river. Mr. A. B. Paul of the Calumet mine circulated a petition this week protesting against the abandonment of the Old Diggings and Redding wagon-road by the Board of Supervisors. Five or six years ago when this was declared a county road there was not a quartz-mill in the Old Diggings; now there are five and the road is an absolute necessity. It is in a deplorable condition and needs attention at once.

Trinity.

RIVER MINING.—*Trinity Journal*, April 26: R. M. Dodge of San Francisco arrived Tuesday and left Wednesday for French creek, where he will take charge of the financial side of the Lower Trinity company's operations in that neighborhood. The company intends to work the river-bed on a large

scale this summer. Times will be good in that vicinity.

TRINITY CENTER.—The weather has been very favorable for work in the mines for the past few weeks. Boss & McClary have been working a full crew of men on their ditch preparatory to opening up their mines for the season's run. A. P. Hanks has been running his claim for some time, and the China company has been running steadily almost all winter. Mining interests in this neighborhood have assumed a most encouraging prospect for the future, and a lively boom is anticipated in the neighborhood of the Cinnabar mines on East Fork, just as soon as the snow will permit of prospecting. The ledge discovered by E. Shumacher in the vicinity of the Cinnabar mines, and the third interest in which was recently purchased by Messrs. Grotefend and Reid, promises to be one of the best properties of the kind in this northern country.

Siskiyou.

CLEANUP.—*Yreka Journal*, April 26: Jos. Williams, who has been working a placer claim in Hi You gulch, a tributary of McAdams creek, cleaned up \$900 last week, after a short run, and has a very rich paying mine. A man named Smith, a Yankee genius in the matter of mining or any other skillful work, has been realizing good pay from the old Walker & Squiers ledge on Indian creek, which he purchased recently, and hauls the quartz to the mill near Hooperville. C. Schroeder, of the Schroeder & Werner quartz ledges on head of Deadwood creek, is now busily working a force of men, in getting ready for operations in mine and mill, just as soon as the snow melts off sufficiently to start up. Being high up in the mountain, the snow is quite deep, though melting rapidly from the mild weather and warm sun lately. Nort Hawkins and S. Billips, who have been working some old tailings on Greenhorn creek, below the old Lige Clark claim, took out a large amount of coarse gold dust last week, the adobe in the tailings, which had never been washed, being rich with gold-dust.

Tuolumne.

TUTTLETOWN.—*Tuolumne Independent*, April 26: Messrs. R. Coughlin and J. Holmes are having a fine prospect in their mine, on Jackass Hill, Tuttletown, with flattering indications of a large pocket soon. Quite a mining boom seems to have struck Tuttletown lately, as there are more men to be seen prospecting in that vicinity, at present, than there has been for over 30 years. Messrs. Henry Eckel and James Kerr of Springfield took out a fine pocket from their mine, near Tuttletown, on Friday of last week. The exact amount we are unable to state. This mine is leased from Antoine Vincent, and we hope Messrs. Eckel & Kerr will now receive a merited reward for their energy and perseverance in developing the mine.

NEVADA.

Washoe District.

SIERRA NEVADA.—*Virginia Chronicle*, April 26: On the 630 level a southwest drift is advanced 382 feet from the shaft station, continuing in a porphyry formation carrying water.

UNION CON.—On the 1465 level from the north lateral drift, opposite west crosscut No. 4, east crosscut No. 1 is advanced 315 feet, passing through one foot of clay into porphyry.

MEXICAN.—On the 1465 level west crosscut No. 4, 100 feet south of No. 3, from the north drift from west crosscut No. 1, from the main north lateral drift, is extended 172 feet, continuing in porphyry carrying lines of quartz.

OPHIR.—On the 1300 level in working southwest-erly from the top of the raise carried up 28 feet above the south drift from the end of the east crosscut from the shaft station, following the ore streak found in the raise, 37 tons of fair-grade milling ore were extracted and raised to the surface, the average assay value of which is \$25 per ton.

CON. CALIFORNIA & VIRGINIA.—No discovery of new bodies of ore has been made. During the week extracted 2896 tons and 1820 pounds from the above-mentioned points. Shipped to the Morgan mill 1734 tons and 1850 pounds of ore, and to the Eureka 1767 tons and 1970 pounds; battery sample assays showing an average value of \$21.68 per ton. Bullion valued at \$13,387.13 shipped to the Carson mint. Bullion valued at about \$12,000 on hand in local assay office.

BEST & BELCHER.—On the 1200 level the north drift is cleaned out and repaired 623 feet.

GOULD & CURRY.—On the 400-level west crosscut No. 1 is extended 605 feet. Formation, hard porphyry.

NORTHWESTERN CON.—Shaft down 20 feet below the 100 level.

ANDES.—The 420 level west drift from the shaft station is advanced 92 feet, and continues in porphyry, clay and seams of quartz.

SAVAGE.—Shipped 445 tons of ore showing an average value of \$23 per ton by battery sample assays. Bullion on hand valued at \$27,334.56.

WARD COMBINATION SHAFT.—Resumed extension of drift into Julia Con. ground.

CHOLLAR.—Extracted 451 tons of ore, battery sample assays showing a value of \$22.45 per ton.

POTOSH.—On the 930 level the winze is down 75 feet. In the bottom are streaks and bunches of ore giving good assays. The raise above that level is up 108 feet and has passed through the quartz and is now in porphyry.

ALPHA.—The 600 level east crosscut is in 32 feet and continues in porphyry. The 600 level south drift is out 38 feet, face in porphyry.

EXCHEQUER.—The 600 level north drift is out 245 feet, and continues in quartz and porphyry.

CON. NEW YORK.—The 650 level west drift is in low-grade quartz. The 960 level south drift continues in low-grade quartz.

IMPERIAL.—The 500 level north drift from the west crosscut is out 165 feet and continues in porphyry.

YELLOW JACKET.—Shipped 400 tons of ore showing average assay value of \$21.75 by battery sample assays.

CROWN POINT.—Shipped during the week 860 tons of ore, showing an average value of \$19.33 per ton by pulp assays.

KENTUCK.—The winze below the 950 level is still in ore.

CONFIDENCE & CHALLENGE.—The 850 level west crosscut No. 1 is in low-grade quartz.

HALE & NORCROSS.—Shipped 1057 tons of ore during the week, showing an average value of \$21

per ton by battery sample assays. Bullion on hand valued at \$35,536.90.

BELCHER.—The 300 level west crosscut is in 100 feet, the face in quartz and porphyry.

SILVER HILL.—The 260 level northeast crosscut from the northwest drift continues in clay and porphyry. The 160 level south drift is in vein matter.

SEG. BELCHER.—The 85n level Belcher joint crosscut continues in quartz.

JUSTICE.—During the week crushed 217 tons of ore showing a value of \$29.36 per ton by battery sample assays. The raise above the 622 level is in low-grade ore. The winze below that level is in good ore.

ALTA.—The ore output this week was 425 tons, showing an average assay value of \$23.75 per ton by pulp assays.

OVERMAN.—Shipped 303 tons of ore during the week, showing an average value of \$17.77 per ton by battery sample assays, of which \$10.40 was gold. The northwest drift is in low-grade quartz.

UTAH.—On the 725 level west drift is advanced 92 feet from the shaft.

OCCIDENTAL CON.—Continue to extract ore of good quality from the stopes on the 400 and 450 levels.

Sylvania District.

FURNACES.—Inyo Register, April 26: The Sylvania boom has given a new impulse to Big Pine. Crocker Bros. have purchased an interest in the mines. The new road through Ashmore's pass was finished last week. Denny Hession has the Sylvania coal contract, and left a few days since with provisions, tools, etc., to begin work. George Hall started two 6-animal teams from Big Pine Saturday, loaded with lumber for the company's buildings. The machinery for the furnaces is expected down this week. No one need expect to hear of a full force of men being put to work in the mine for a time yet, as the intention is to get all preliminary work done before putting on a full force. Then mining begins in real earnest. The works, boarding-house, etc., will be in Inyo, while the mine is over the State line. Ben H. Yandell will be the company's clerk.

Tuscarora District.

NEVADA QUEEN.—Times-Review, April 25: North gangway from 600-foot station of North Belle Isle has been advanced 25 feet.

GRANO PRIZE.—500-foot level—Face of east drift on north vein extended 11 feet, and west drift 10 feet, without change.

NAVajo.—East crosscut from the north gangway, 350-foot level, extended 12 feet; the face is in bard rock.

BELLE ISLE.—South drift from the crosscut, 350-foot level, extended 9 feet, showing considerable high-grade ore.

NORTH BELLE ISLE.—The work above the 300-foot level continues about the same. In making the air connections, streaks of good ore are found through the concentrating ore. North gangway from the shaft on the 600-foot level has been advanced 25 feet. The rock in the face is getting harder, and shows seams heavy with iron. The water is beginning to show considerable pressure.

NORTH COMMONWEALTH.—Second level—Joint crosscut has been extended 16 feet, cutting spar seams and water. South drift has been extended 27 feet, total 57 feet.

DEL MONTE.—Second level—Joint crosscut east has been extended 16 feet, and is looking much more favorable than when last reported.

COMMONWEALTH.—The mine has been retimbered wherever required, and is in good condition. We have borrowed timbers from Grand Prize and North Belle Isle, so the mine can be kept all right until more can be obtained. Concentrator running all right; about 300,000 pounds concentrates on band.

ARIZONA.

MILL.—Mohave Miner, April 26: The Rattan-Ruth Mining & Milling Co. are making preparations to erect a mill on the Colorado river, near their mines. They have their mines well developed and a good many tons of rich ore on the dump awaiting the building of reduction works. The Atlantic M. Co. closed down on the Dean mine for the present. After a run of a few weeks it has been satisfactorily demonstrated to the company that a sufficiently high percentage of the silver cannot be extracted from the ore without roasting. Concentrators will be put in as soon as possible, and a roaster at no distant day. J. M. Dawley, formerly superintendent of the Atlantic Mining Co., has severed his connection with that company in order to more fully devote his time and attention to the erection of the 15-stamp mill, concentrators, etc., now being built on the O. K. mine, in Gold Basin. Beebe's teams left this week for the Basin to haul the machinery, etc., for the mill.

PLACERS.—Prescott Journal-Miner, April 23: About 20 Mexicans are camped on Big Bug, engaged in placer mining. They work on the co-operative plan, and wash from \$3 to \$5 per day to the man. Joseph Howell recently sold five claims in Santa Maria district for \$77,000. The purchaser is Martin Lewis, the Colorado mining man. He has also purchased machinery to put on the properties, and will at once commence active development. Black Canyon creek, near Gillette, is evidently gaining in reputation as a placer-mining center, judging from the number of miners who have been washing gravel there during the winter. In most cases good wages have been made. A party of three miners are successfully working the Kimball mine on Lynx creek, and astraining the ore, which pays from \$40 to \$60 per ton. This is the property on which Geo. W. Curtis, deceased, erected a mill and soon afterward abandoned. In the vicinity of Sycamore creek, near the Verde, the Alexander boys recently discovered a mine which, if it should hold out as well as surface indications show, will make them wealthy. This section is unprospected, the ruggedness of the mountains and its comparative isolation making it somewhat uninviting to the prospecting fraternity. The Boggs and Hackberry miners, on Big Bug, are as active as usual. In the former the main shaft is down 200 feet in good ore, while with the latter the character and richness of the rock is such as to make it among the big mines of the county. About 60 men are employed in both mines. Both the north and south drifts in the Black Horse mine are being pushed as rapidly as possible. The north drift is in good ore all the

way, while at 30 feet in the south one the best ore yet found in the mine was encountered. General Manager Carlisle and his superintendent, Robert Cartmell, are both elated at the rich development in this property, both in the shaft and the drifts.

THE REYMERT MINES.—Florence Enterprise, April 26: Very few people residing in Pinal county possess an idea of the magnitude of the work accomplished at the mines of the J. D. Reymert Mining Co. during the past year. Judge J. D. Reymert, president of the company, was in Florence this week, and he gracefully acceded to the request for information relative to the progress made under the new management. Judge Reymert said: Since April 1, 1889, the sum expended in improvements, enlarging the capacity of the mill, machinery, buildings and explorations in the mine, was about \$160,000, of which \$75,000 was derived from a voluntary assessment and the balance from the product of the mines. We have increased the roasting capacity from 20 tons to 65 tons in 24 hours and have all the machinery necessary to treat that amount. Up to March 1st, the mill had run but 160 days of 321, owing to the deficiency in the water supply. The mines are worked upon the same system as previously, that is, they are timbered wherever the ground is soft or unsafe. We are following the fissure, which appears to be continuous, the whole length of the seven claims—nearly two miles. Between May 1, 1889, and March 1, 1890, there was milled 3348 tons of ore, which netted at the San Francisco mint \$60,432. This is not a fair criterion of the yield, in consequence of the difficulties we had to contend with; the construction of new improvements and stoppages. We have a store with an ample supply of goods, and have built a pump station below the mill to return the water after being once used. We save nearly 90 per cent of the value of the ore at present and the tailings assay from four to five ounces in silver. Our superintendent is a very capable man and displays remarkable energy and a due regard for economy in the matters under his charge. The mine is a great property and will eventually become a large and steady bullion-producer.

COLORADO.

THE SILENT FRIEND.—Aspen Times, April 25: The developments in the Silent Friend mine at Pitkin attract much attention in Aspen on account of the fact that Aspen people are interested in that property, while many other claims in that district are owned here. The ore chute is opened at two points about 40 feet apart, the lower development being about 140 feet below the bottom of the old stope. The main drift has been driven into the ore about ten feet. The ore body appears to be from four to seven feet in thickness; and there seems to be no reason to doubt that a great bonanza has been opened. About 700 tons of mineral has been extracted since the discovery was made and shipments will be immediately begun. Manager Murphy, who has just returned from the property, estimates he will soon be able to output from 25 to 50 tons per day. The most interesting feature of this development is the high-grade character of the ore. A large number of assays have been made and the lowest return so far received has been 80 ounces silver, with the highest running up to 400. The lowest percentage in lead found has been .45, while some of the assays have indicated 72 per cent in this metal. It is believed that the entire ore body will average close to 200 ounces in silver and about 50 per cent in lead.

THE HUNTER PARK CO.—Important developments are expected soon in the shaft of the Hunter Park Mining Co. This shaft has now reached a depth of 600 feet and is still in the silicious shale. It is thought that the blue lime will soon be reached, which is probably about 30 feet thick at that point. The flow of surface-water has necessitated a No. 6 Cameron pump being placed on the property. A station has been cut 475 feet down the shaft and all the water will be collected there.

NORTH STAR STRIKE.—An important strike is reported in the North Star, the new discovery in the south workings of the mine. H. E. Walker, the manager, says they have two and one-half feet of 125-ounce ore. The strike was made last Sunday, and has been gradually improving. The ore appears to be a chimney, but may be a regular chute. About eight tons of the mineral has been extracted ready for shipment.

DAKOTA.

ORO FINO.—Deadwood Pioneer, April 22: After a long and exasperating series of delays, which no amount of foresight could have avoided, dirt from the big cave is again being hoisted at this mine, but the most diligent inquiry fails to elicit anything concerning the intention of the company now prospecting the mine. It is whispered upon the street that the diamond drill core has been very disappointing, but of this no one really knows anything definite save the superintendent and his assayer. The only thing really not guessed at is that the bump tablets are doing fine work, saving all the pyrite, rusty gold and escaped amalgam.

MILLER SMELTER.—A new coke-house holding ten carloads of coke has been completed, and the Northwestern Transportation Co. is now delivering coke at the works. Dr. Carpenter has bargained for 400 tons of ore. The machinery has been traced to Chicago, and left there upon the 11th. It should soon be here. The company will buy all ores offered no matter what their character, always provided they carry gold and silver enough to pay for treatment.

PLENTY OF ORE.—Deadwood Pioneer, April 28: When the baby experimental plant was built, and the announcement made that it was to be replaced by a smelter of 250 to 400 tons capacity, the corporation's guard of cranks who survived the war of extermination inaugurated against them by representative people of the Hills, exclaimed, "Oh, what a force! Why, they can't get 20 tons of ore per day; how will they supply a 400-ton plant?" Dr. Carpenter, who will have the management of this big plant when completed, is in the best of humor at the situation. To a Pioneer reporter he stated a few days since that he sees his way clear to all the ore he wants. "In fact," said the doctor, "what is bothering me now is to get a plant big enough to treat the ore offered. Ruby Basin, Bald Mountain, Galena, Strawberry, Spruce Gulch, Carbonate,

Squaw Creek, or any of them can supply a good deal more than I anticipated." Representative mining men, to whom the statements were subsequently made known, verified them, adding that six months ago it might have been difficult to supply 400 tons of ore per day. The unquestionable success of pyritic smelting, however, and the knowledge that it can be applied at living rates has so stimulated industry that in the opinion of many, the mines of the districts named can now easily supply double the quantity to keep a 400-ton plant busy. The Hills are not half prospected, either.

IDAHO.

MINING ACTIVITY.—Boise Statesman, April 22: Great attention will be directed during the summer to the quartz mines in the vicinity of Boise and in the Boise Basin. Investors who have never visited these productive and interesting regions should do so this summer. Their journey in the mountains will be found of surpassing interest. The scenery is grand and beautiful, the mountains rich in minerals and timber. The failure of Silver Mountain has dampened the ardor of English investors, but no resident of Boise City or Ada county can be blamed for that failure, as everybody wells knows, and every miner whose judgment was worth a farthing always asserted that there was absolutely nothing in Silver Mountain. On the other hand, the most experienced miners in the country claim and have always claimed that the richest gold-bearing lodes in Idaho would be found in the Boise Basin. The history of the huge fiasco in Silver Mountain would be doubtless interesting to our English cousins, and some day when time permits we may unfold to them a tale which will prove how innocent and glibly a Briton can be.

MILL RUNNING.—Silver City Avalanche, April 26: The DeLamar mill is running right along as usual, grinding out the precious metals from ore out of the Wilson mine. The mine furnishes a constant supply, and could keep three or four mills, just like the DeLamar mill, running constantly the year round for an unlimited period. Soon the tramway will be ready for conveying ore from the mine to the mill, which will materially reduce expenses, and will allow the energetic owner of the property a clear profit on \$5 ore. Capt. DeLamar has demonstrated that low-grade ore can be worked, although the ore that he mills from his mine averages well. Everything about DeLamar now presents a lively appearance, which indicates that the mines are paying.

BLACK JACK.—Supt. E. H. Dewey informs us that the crosscut being run to cut the Black Jack and the Empire State lodes struck bard rock which lasted for a few feet, and then entered ground that now needs timbering. The crosscut is in over 400 feet, and is progressing as well as the character of the ground will permit.

LOWER CALIFORNIA.

THE BIG RUN OF AURORA ORE.—Lower Californian, April 24: Things are certainly lively at Alamo. Col. Lane's mill has been running night and day for six weeks. The Princess Co. and the El Paso Co. are in full blast, the latter company having developed enough high-grade ore in the Elsinore alone to keep the mill busy. Col. Kern's mill is getting ready as rapidly as possible. At Mexican gulch unfortunate litigation has kept the Lucas mill shut down, but Col. Lucas, through the opportune sale of a Colorado mine, is healed, and says he will fight to the bitter end. A. H. Butler is making arrangements to run his mill. Two runs of Aurora rock were put through Lane's mill recently. The first lot of 25½ tons netted \$55.44 per ton, and the second of 5½ tons netted \$145 per ton. No further proof is needed to show that the owners have a bonanza in this mine. J. M. Gonzalez, who owns an interest in the Aurora, has also leased the Placer mine from Crosthwaite and Lopez, and put men at work developing it. Thomas McManus has received a concession from the Government to prospect and work mines of all kinds and gold placers on Cedros Island. This will not conflict with the rights of the Cedros Island Mining Co. nor of the Land and Colonization Co. Capt. Baines, vice-president of the El Paso M. & M. Co., is interested in the concession for his company. A prospecting and exploring party will be down in a week or ten days to explore the concession. Ex-Gov. Ryerson, president of the San Nicolas M. Co., has made arrangements to re-open the mine on a sound financial basis. A. Morales has disposed of his shares, and several Eastern capitalists have become interested in the property. The other mining interests in the vicinity of the Real are going ahead.

MONTANA.

ROCKET DISTRICT.—Anaconda Review, April 25: Much activity is manifest among the mines of Rocket district, near Wickes, and many properties are being developed with splendid results. The Bennet and Bender, Uncle Sam, Cierivas, and several other mines in this district are making an exceptionally good showing, and in some of them large ore bodies are said to have been uncovered. Shipments of ore have been made from the Bennet and Bender, and in the 125-foot incline shaft sunk on the Uncle Sam a large body of galena ore carrying gold, silver and copper has been exposed.

CLARK'S PURCHASE.—Phillipsburg Mail, April 26: The Agua Frio group of mines in Beaver Creek district passed on the 7th inst. to Charles Clark, one of the principal owners of the Granite Mountain and Bi-Metallic, the consideration being \$75,000. With the Agua Frio's development and guaranteed productiveness, mining men are of the unanimous opinion that Mr. Clark has secured a bargain. Under the ownership of Hazelton and Harris of Helena, the mine produced over \$250,000, and has netted the owners quite \$10,000 per month for several months past, and as they now have \$75,000 as the purchase price, they, too, are to be congratulated. Under its new ownership the mine will be subjected to an elaborate system of development, and is destined to become one of the famous producers of Montana.

GRANITE MOUNTAIN.—The output for the week ending April 24th was 55 bars of bullion, containing 87,240 ounces fine silver and 171 ounces fine gold.

THE ALICE CO.—Inter-Mountain, April 26: The Alice is working a full force of men at both the

Alice and Magna Charta. Sinking continues at the main shaft of the Alice, now within 10 or 15 feet of the 1300-foot level, which will be reached by Tuesday. Sinking will then suspend for the time being, and the mine will be developed below the 10. Two Burleigh drillers are already at work on the 1000-foot level, although no development of importance has yet been made. Sinking progresses at the Blue Wing, and the shaft is approaching the 400-foot level. All 80 of the Alice stamps are dropping steadily, and silver at \$1.05 means a big difference for the Alice people, and a long vista of prosperity opens up before them.

AT THE SILVER BOW.—The miners at Silver Bow shaft No. 1 laid off yesterday, and the work of removing the old engine to shaft No. 2, just west of the Silver Bow mill, was begun. This shaft, which was started last summer by the company, is now 300 feet deep, and a crosscut has been started which will connect with the 400 of shaft No. 1. The old engine at Silver Bow shaft No. 1, will be set up at shaft No. 2 at once and sinking will again be resumed. The cages were put in shaft No. 2 yesterday. The Butte & Boston reduction facilities are inadequate, as the mines are capable of producing vast quantities of ore. The Silver Bow mine is looking as well as ever, and is undoubtedly capable of becoming one of the greatest copper properties in the world.

NEW MEXICO.

DOS CAÑEZAS.—Silver City Enterprise, April 25: The 15-stamp mill at Dos Cañezas began operations Tuesday, and that camp will again be classed with the bullion-producers. Harry Fowler is working mining claims No. 1 and No. 3 in Camp Velines. He has on the dump ready for shipment several tons of ore which will run 45 per cent lead and 20 ounces in silver per ton. He is trying to concentrate his second-class ore in the Bremen mill. Jack Fleming and Hank Dorsey shipped 7½ tons of high-grade ore from the Chamberlain mine last week to the Socorro smelter. The Chamberlain is in Stonewall district about three miles from the line of Old Mexico and but a short distance from Carrizillo springs. They have uncovered besides their high-grade ore a body of free-milling ore over 20 feet in width, which assays \$25 per ton.

The strike on the Alhambra continues to grow in magnitude. Since the last issue of the Enterprise the drift on the 100-foot level, where the rich ore was discovered, has been driven 14 feet, making in all 34 feet along the apex of the ore body, and it still shows as strong in the face of the drift as at any point. The owners have sacked and ready for shipment 2 tons of first-class ore, which is estimated to be worth from \$6000 to \$8000 per ton.

OREGON.

ROBINSONVILLE MINES.—Baker City Democrat, April 28: A visitor in our city for a few days is Mr. B. L. Duncan, who for the past winter has been engaged on a contract of tunnel work on the Strausburg mine, owned by Frank Clarno and others of Portland, and situated between Granite creek and Robinsonville. The Strausburg has been developed the past winter to the extent of a 100-foot tunnel, in running which two splendid ore veins were cut, and from which good free gold prospects were obtained, the highest assay being \$87 from ore sent to Portland. Graham Bros. have done good work this winter on their property and a good showing has been made. Their tunnel is 11 feet high and 10 feet wide, the width of the ledge. A rich strike was made a few days ago in the Berry mine, and gold specimens are being taken out by the handful. The Hidden Treasure, owned by Hayes & Co., has been extensively developed the past winter and makes a fine showing. Other properties have had more or less work done on them, but the heavy snows of the winter have greatly interfered, and this obstacle has not yet been overcome.

UTAH.

ORE ON GODEVA MOUNTAIN.—Eureka Chief, April 25: Ore was struck Saturday on the Godeva group, on the further side of the Godeva mountain, about a mile or a mile and a quarter southeast of town. The Godeva group is patented ground, and owned by a company, the principal members of which are J. Q. Packard, John McChrystal and C. C. Goodwin, editor of the Tribune. The strike will be developed as rapidly as possible and Godeva mountain will hereafter do her share toward making this the best camp in the country. There are other fine claims on this mountain, and this strike will doubtless give the owners confidence and cause work to be pushed with renewed vigor.

A STRIKE IN THE VICTORIA.—Saturday evening a body of ore, of the same character as the Eagle ore, was struck in the Victoria shaft in Eagle canyon. The Victoria is adjacent to the Eagle and is owned by Noab McChrystal and N. D. McLeod. W. R. Wallace recently sold a third interest in this claim to Noab for \$5000. The boys expect to develop a large body of ore and feel jubilant over their good fortune.

CAMP CROSSCUTS.—Park Record, April 26: The Union and also the Crescent concentrator will soon resume work for the season. The Ontario bullion shipment for the week was 30 bars, containing 15,692.45 fine ounces of silver. It is expected that Contractor Dull will get his rebuilt boring machine at the Aochor shaft in operation the coming week. Only one man is working at the Creole No. 2, pending the settlement of certain important negotiations between the owners and lessees. The Ontario gulch road is now in condition for ore-hauling and during the week about 320,000 pounds of Ontario ore was sent to the Mackintosh sampler for shipment to the smelters. Ore-hauling from the Mayflower No. 7 leasers' mine has been resumed, and the Woodside, Daly, Alliance, Nevada-Northland and others will follow suit with big ore shipments just as soon as the wagon-roads get in better condition. Several jigging outfits are being put in working order from below the Union concentrator to a point near the lower depot, and they will be the means of converting lots of waste into a marketable article that will be shipped to the smelters.

MECHANICAL PROGRESS.

Recent and Needed Patent Improvements.

The steam hammer has given such perfect results in the cushioning effects of steam that a substitute in the form of compressed air must be employed where other motive-power than steam is used.

There is quite a tendency among inventors and mechanics to bring into use the driving effects of hydraulic power whenever a steam plant is to be called upon to operate the machinery, and the mill privilege, with its never-failing steam, must be utilized in compressing air that the machinery may have some of the expansive benefits that are to be found in the steam engine.

The exhaust from a steam boiler should step right back into the boiler as readily as if the engine was simply an exhaust injector, and the unite of heat that pass up the smoke-stack should be dispensed with at once by firing up the plant on the principle of the soda engine. It would seem quite easy to construct a boiler with the fire-box in the same compartment with the steam-room, and the fuel as well as the draught supply pumped in with the feed-water, and allow the engines to make use of all the gases, as well as the mechanical union of heat and water, known as steam. If fears are entertained for the air-pump when the condenser is in use, a highly hydrogenous fuel should be used, which will leave the greater part of its own product of combustion the same as that obtained by evaporating the feed-water.

Where a battery of boilers are kept under fire, the engine must keep a set of pumps at work that the freight as well as the passenger elevator may be driven by hydraulic power. Speaking of boilers, how an inventor must shake his head when he examines the amount of waste found in a modern steam plant, and what a wonderful chance there is for an improvement. Will some inventor take notice?

We shall expect before long to find in the list of patent improvements a substance or a compound ground up and sold in the form of corn cakes that will disintegrate spontaneously, similar to sky-rocket powder, which will only need to be thrown into a soda-tank to supply an engine with driving-power for ten hours.

A novelty in the manufacture of steam pipes consists in the fact that a core of some kind has been invented which may be thrust through a mass of melted steel after it has been poured into the mold. The utility of such a device goes without saying.

A machine has been devised that separates quartz sand into different grades from 4 to 60 by simply allowing the sand to drop or rain down on to a revolving cylinder. Every grain receives the same velocity when it leaves the cylinder, and the simple resistance of the air effects the separation—so it is claimed.

The Hammer's Many Crimes.

The hammer is an ever-present tool. It is found on every work-bench. No kit of tools, however small, is of any value without a hammer. It is found in every household, in every shop, in every place where work is to be performed. We cannot do without the hammer; but it is guilty of many crimes, especially when used by an unskillful or careless hand. A correspondent of the *Blacksmith and Wheelwright* recounts many of its false moves, and suggests remedies therefor. We copy as follows:

The ever-present hammer. How many its crimes! The body-maker carelessly lets it strike the panel when driving in a nail, or perchance he uses it to set a closely-fitted panel or piece of framework. The wheelmaker thinks nothing of topping the fellow with its hard face, and should be forget or neglect to do so, the blacksmith makes good his oversight. It's only a little bruise, the paint will cover it. But will the paint cover it? There's the rub. The paint may cover it; but it is bound not to remain covered, and soon the would-be-hidden injury appears in a condition more decided than when first inflicted. A knot, a plug, or even a panel check may be hid, but not a hammer mark; and yet the latter is a fault common in almost every carriage factory.

A hammer mark differs from other injuries, owing to the fact that the fiber of the wood is broken and disintegrated, and those nearest the surface are either severed at the edge of the hulse or they are stretched and forced down; if broken short off, the injury is more easily overcome than when elongated.

The first act toward repairing the evil is to moisten the wood. Hot water is the best, as it penetrates more quickly than cold. Enough should be applied to penetrate to the bottom of the bruise, then allow the wood to remain undisturbed until thoroughly dried out, after which cut off the raised wood with a sharp chisel and fill in with oak or silex mixed to the consistency of putty with linseed oil, being careful to level off before the mixture has hardened.

When the edges are not broken, cut across the grain with a sharp chisel, removing a little of the wood, then wet as before and treat it in like manner with the composition. It is needless to try to fill up the broken wood with common putty, as it will be sure to shrink and leave an uneven surface. The silex, however, makes a filling that effectually resists moisture,

or the action of oil or turpentine. When wood has an open grain, and for hriees of a minor character, the body-maker, or rather the carriage-builder, will find it profitable to moisten the surface with warm water, and after the moisture has thoroughly dried out, clean off the raised grain with a sharp scraper; then fill the grain with a mixture of silex ground in oil, and thinned with turpentine, apply it with a coarse brush and rub off with curled hair within 15 minutes after the material is applied; if allowed to stand too long it will harden and much labor will be required to level it. If silex cannot be procured the next best material is cornstarch passed through the paint-mill with enough linseed oil to make a pasty compound; thin down with turpentine before applying.

Bruise on the hard wood of rime and axle beds are more troublesome than those of soft wood, but they can be treated to an advantage by following the course we have recommended; but it is best to fill the grain with the silex mixture reduced as thin as varnish, as a thicker mixture would not penetrate far enough to be of any service.

THE COLORS IN TEMPERING IRON.—A writer in a technical cotemporary says: "The cause of the production of these colors is now universally acknowledged to be the formation of thin films of oxide on the surface of the metal when it is heated in presence of air. Even this question was at one time in dispute, such men as Davy and Thomson taking the opposite view. But Davy afterward showed that steel might be heated in a neutral gas, such as hydrogen or nitrogen, without being colored on its surface, and that steel remained colorless when heated under the surface of oil or of mercury. I have frequently heated bright strips of polished steel for hours under the surface of mercury or oil, without discoloration, while they would have been instantly colored at the temperature used if heated in contact with air. I think, further, that there can be little doubt that the oxide so produced is practically transparent, first, because the sequence of colors is what would be expected in films of a transparent substance when the thickness of the films gradually increases; also because of observations on the reflected light, the color of which varies somewhat at different angles; but chiefly because it is found that on increasing the temperature a little above the point necessary to produce a dark blue, the color gradually disappears (though doubtless oxidation proceeds more rapidly), and the surface, though covered with more oxide, becomes almost colorless again. When it is granted that the colors we are considering are the result of oxidation, it would at once appear probable that the nature of the surface to be heated, its freedom from dirt and grease, and the length of time during which it is heated, would all exert a considerable influence on the shade produced. It would also appear probable that the amount of carbon present in the metal, and the condition in which the carbon existed, would have comparatively little influence. Hitherto, my experiments have been chiefly directed to the study of these simple and, as they appear, almost self-evident conclusions."

EFFECT OF STRESS IN STEEL.—In a paper on the behavior of steel under mechanical stress, by C. H. Carns Wilson, read before the Physical Society (British), the following conclusions are reached: The effect of uniform longitudinal strain on a steel bar is threefold. (1) A strain of the molecule; (2) a strain of the elements; (3) a production of flow by the strain of the elements. The elongation due to flow is the strain usually observed, and this may be either recoverable or irrecoverable. The strain of an element is made up of a uniform dilatation and a uniform shear about an axis parallel to that of the bar, and therefore the flow elongation consists of an increase of volume, together with a certain amount of eliding. The author summed up as follows the general conclusions to which his experiments led him: 1. Mechanical strain produces an atomic disturbance in a bar, and this disturbance increases regularly with the stress. 2. For small stresses the disturbance is only partly permanent, but as the yield point is approached it becomes wholly permanent. The magnetic properties of a loaded bar are in general different from those of the same bar unloaded, but there is certain stress, or range of stresses, over which the bar has the same magnetic properties whether it be loaded or not.

FORCED DRAUGHT is coming to be looked upon with disfavour in the British navy, owing to the many breakdowns which have attended its application on shipboard. It is said that a trial trip made under forced draught does more injury to the boilers than four years of ordinary use. More recently, however, the Admiralty has authorized a series of experiments with forced draught on shipboard with locomotive boilers. The plan proposed is this: Instead of forcing the air through the furnaces by means of fans there will be established induced draught. The plan is to operate at the root of the funnel by a fan acting upon the products of combustion, and so fitted that it may be used to accelerate the draught to any degree required. The arrangements in the boiler-room are not interfered with, the driving gear taking the place of the high-speed engine now used for forcing air. One thing that the steamship City of Paris conclusively proved was that forced draught on the closed stokehole system can be efficiently maintained at sea,

SCIENTIFIC PROGRESS.

The Refinements of Modern Measurements and Manipulations.

An address recently delivered before the Engineers' Society of Western Pennsylvania, as reported by the secretary of that society, contains much useful information. We make brief references as follows:

Progress is to-day written upon every page of the world's record, and particularly in the realms of science it is making its unmistakable mark, from thence extending outward to the vast range of correlated studies that go to make up the sum of human knowledge and economies. In astronomy and astronomical engineering, in physics and chemistry, in civil and mining engineering, in meteorology and in metrology and in mechanics, to say nothing of many other branches of science, do we find progress as the watchword and the theme that exalts and moves the human brain to grander and better achievements.

The day has forever passed when we are willing to say or believe that "three harleycorns make one inch." Nor is the advanced mechanic of to-day satisfied with his box-wood rule, graduated to thirty-seconds of an inch, save for the coarsest approximate measurements; but he must have his standard graduated to one one-hundredth inch for his coarse measures, and his micrometer gauges reading to one one-thousandth for ordinary work. Even in our iron and steel works, the old-time wire gauge, that for a long time held its own, has been displaced by the micrometer gauge of infinitely greater accuracy.

Prof. Wm. A. Rogers has shown that many of our modern mechanics can calliper to one thirty-thousandth of an inch. These, however, are coarse, rough measures when compared with others that may be mentioned. In the domain of astronomical measurements great progress has been made of late years by the use of refined instrumental means, as well as the many methods devised for the elimination of instrumental errors. The divisions of the meridian circle have been brought to astonishing accuracy.

The various enlightened and civilized nations have standards of weight and measure that have slowly been evolved from the cubit, the span, the finger-length and the harleycorn, if you please.

Nations have their standards. On what are they based? The French meter is presumed to be one ten-millionth of the earth's quadrant, the English yard evolved from the harleycorn, etc., but the measurements of precision in our day demand an indestructible, absolute and unalterable basis for our standards, so that if they all be destroyed the original is still available. Prof. Michelson has chosen a wave length of sodium light as the basis for a new standard, a something that will remain forever of the same absolute linear value. Now a wave length of sodium light is, roughly speaking, about one forty-two thousandths of an inch long. Now, as this is an appreciable figure, it is evident that any method proposed to measure its absolute value must be of the highest accuracy. The method devised by Prof. Michelson in the refractometer has certainly brought the work to marvelous perfection. He has shown that the error was not greater than one part in two millions, and possibly would be made not greater than one in ten millions. Gentlemen, can you appreciate such a quantity? Yet here is a physicist, with a high ideal of perfection, taking the pulsations that are sent earthward by the sun, and by methods within the reach of human skill, actually recording them upon a standard bar immersed in a freezing mixture, and giving us a universal standard based upon the absolute value of a wave length of light. You may appreciate some of the niceties in the construction of this interferential refractometer when I tell you that in making some of the optical surfaces for use with it, Prof. Michelson demands an accuracy closely bordering on one-millionth of an inch.

In mechanical appliances and in modern machine work great strides are being constantly made toward greater and greater perfection, and, as I said in the outset, the mechanic of to-day is not satisfied with the coarse measures and gauges of our early days; but he must have his steel graduated rules, his micrometer-calipers, his standard reamers, etc. What the English nation owes to their Whitworth, we, in turn, owe to such firms as Brown & Sharpe, Pratt & Whitney, Sellers, Bement, Warner & Swasey, and others, for their valuable contributions to metrology, and their standards of various kinds that have contributed so much to advance the mechanics in this country. The standard measuring device made by Brown & Sharpe have become a power for accurate work. The standard gauges of the Pratt & Whitney Company now find an honored place in all high-class machine shops; and our American machinists are greatly indebted to the labors of Prof. W. A. Rogers and Mr. George M. Bond, who designed and carried into execution that wonderful instrument of precision called the Rogers-Bond comparator, from which has emanated many standard tools, and which has assisted so largely in the introduction of interchangeable parts in American machinery.

It is true that human hands and human brains must have a limit to their capabilities; but where shall we place that limit? Watt

gave us the horse-power as the unit of measurement, Joule gave us the better one of the foot-pound unit; King Henry's arm may have served for the long measure, and the harleycorn for the short measure, but the meter and the micron are infinitely superior; yet we still hope for better standards, and are now reaching out for waves of radiant energy from which to make them, and which shall remain as constant as the universe, "whose builder and maker is God."

DISPERSING FOGS.—The novel proposal for the dispersion of fogs brought forward some time since by a Swiss artillery officer, who has placed upon record his opinion that a phenomenon of this kind recently occurring under his observation was due to a discharge of some pieces of ordnance, has excited considerable comment, and in France the statement has led to several published communications upon the effects of artillery fire upon the atmosphere leading to quite a different conclusion. It appears, for instance, that during the siege of Belfort in the Franco-Prussian war, where an average of 1000 discharges of cannon per hour was registered for many days in succession, firing was frequently suspended on both sides, owing to the dense fogs which settled down upon the field of action, an observation which it is thought would give ground for the supposition that concussions of the air near the surface of the soil by interfering with the circulation of the air, bring about that congealed condition of the atmosphere which is a necessary condition for the production of fogs; and again this conclusion, it is remarked, leads to the idea that not only the aggregation of houses in towns, preventing the passage of light breezes, determines the production of fogs in such localities, but also that the concussion of air due to the shocks of town traffic may operate in the same way. The opinion of good judges in this line of investigation is that not only are further observations of such phenomena desirable, but, now that the nature and causes of town fogs are so carefully studied with a view to their prevention and cure, it is well that every contribution to the elucidation of the subject, however apparently insignificant, should receive attention as possibly containing a clue of value.

EFFECT OF HEAT ON METAL AND STONE.—Long iron bridges are built with overlapping slides at the middle of each span to allow the structure to elongate or shorten itself, as the weather is cold or hot. In the Brooklyn bridge at New York the movement between the extremes of expansion and contraction are several feet. An east and west bridge expands more than one running north and south. The same phenomenon is noticed in stone structures. Bunker-Hill monument leans to the east in the morning and to the west in the afternoon. The same is the case with the Washington monument at the National Capital. The slight hill on which the astronomical observatory at Washington is built is found to follow the movement of the sun with a kind of twisting motion in his apparent course from east to west. This movement sensibly affects some of the more delicate instruments in that institution. A plumb-line suspended from the interior of the dome at Washington was found to swing with a circular motion over a space of four and a quarter inches in diameter, indicating a dip of the dome from a perpendicular of eight and a half inches. Phenomena of this kind were first observed by a monk under the dome at St. Peter's in Rome and by him was at first attributed to a third and undiscovered movement of the earth. Science afterward came to his relief and showed that it was simply the action of the sun upon the metal dome.

AIR AND BURNING COAL.—A little more knowledge of the science of coal combustion would be a good thing for most firemen, and would result in a large saving to their employers. A contemporary says: What there is difficult in understanding that coal requires a certain amount of air to burn it we cannot see; yet some engineers shovel in coal with no consideration of where it goes. Many look upon a chimney as an outlet for smoke simply, whereas its purpose is also to supply air enough to properly burn coal. Any engineer can throw coal on a fire with a sluggish draught, and in time it disappears, and with no great increase in the amount of smoke. That is what the gas manufacturer does, but instead of letting the gas be lost by escaping into the atmosphere, he sells it to this same fireman, perhaps, who supplies it with air and uses it, giving light and heat. The fireman would burn it under his boiler if it were cheap enough, as he does natural gas, and it would evaporate a considerable amount of water. But he would do this only when some one else makes it; for, when he makes it himself, under his own boiler, it is worth nothing to him and is thrown away. Now why is not gas made in an ordinary furnace worth as much as that made and stored up for use by means of a gas retort?

A MUSHROOM MYTH.—It is a popular error that mushrooms grow to their full size during a single night. They are, indeed, rapid in growth and rapid in decay, but the same mushroom may be watched growing and expanding for two or three days, and then gradually decaying. It is not unusual for a cultivated mushroom to become attacked by a parasitic mold, which renders it unfit for food, but such a misfortune seldom occurs to the wild form until it is in process of decay.

Mesmerism—Hypnotism.

A correspondent, "W. A. S.," of Fresno, asks for information in regard to "Hypnotism." "What is hypnotism?" "How is it practiced?" "How much is it in advance of mesmerism as practiced 20 years ago?" "Can the hypnotizer gain the power to hypnotize another?" "Can he hypnotize a stranger through the request of a friend?" We will endeavor to answer these questions serially.

What Is Hypnotism?

Hypnotism is a kind of unnatural sleep into which a person may be placed by a peculiar power or force possessed by another. It is generally acknowledged by scientists who have looked into the matter that this force does not depend upon the imagination and that it does not act in an equal degree upon all. There appears to be but a small percentage of people who are susceptible to this force or influence, and a still smaller number who can exercise it. Some scientists have supposed it might be a fluid—in the same sense in which we sometimes speak of electricity as a fluid. It is sometimes called one and the same thing as animal magnetism—whatever that may be. The question of what it consists is quite as difficult to answer as is the same query in regard to electricity. All we know of either is what is made manifest in their effects.

How Is Hypnotism Produced?

Years ago, when men first began to realize that such a force existed, and to experiment with the same, the hypnotizer usually took a seat directly in front of the person to be hypnotized. The former with each hand grasped the opposite hands of the other, the halls of the thumbs resting against each other, remaining thus from five to ten minutes. The hypnotizer then made slow passes from five or six to a dozen or more with open hands over the patient from head to foot, without, however, touching the person or clothing. During this entire time the operator exercised the entire force of his will-power in silent commands that the subject should submit to his will. In later times, and by the constant exercise of this power, operators have accomplished their work in gradually lessened time, until now the best hypnotizers are often able to throw a person into a hypnotized condition by a look or the will of the operator, or at most by the merest contact of the hand upon the lower part of the forehead. In general, persons of strong constitution and vigorous health are capable of exercising the most ready and powerful influence, and those of opposite character are the most susceptible to such influence. That rule is, however, sometimes reversed.

How Much Is It in Advance of Mesmerism?

Hypnotism and mesmerism are one and the same thing. It was at first called mesmerism from the name of the physician who first made it known to the world about the year 1782. Dr. Mesmer commenced his experiments by the endeavor to cure diseases with the common magnet, and soon found that his magnet appeared to exert a peculiar influence on his patients. He subsequently, however, ascertained that the "influence" proceeded from his person instead of the magnet—that he could produce the same impressions by making passes over his patients with his hands alone, without a magnet. He thus learned that the phenomena were not produced by mineral magnetism but by animal magnetism. Hence the treatment took the name, during his lifetime, of "animal magnetism." After his death his memory was honored by his friends by calling the treatment "Mesmerism." In 1784 the French Government ordered the medical faculty to investigate and report upon Mesmer's theory. Dr. Franklin, who was in Paris at the time, was placed upon the committee of investigation. The commission was not unanimous in its report; but the investigation aroused a deep interest among the medical fraternity and intelligent people generally, and experiments and investigations were kept up, in the progress of which one of the leading physicians made the discovery of what he called magnetic somnambulism. This was in the year 1785. This discovery was closely followed by that of clairvoyance. Many of the alleged phenomena connected with this phase of mesmerism have excited more controversy than has attended any of its other conditions, because, perhaps, of the easier field it presents for the work of the imagination, or for downright imposture. No special interest in these discoveries seems to have been taken in England or the United States until about the year 1825, at which time the subject was taken up by Mr. Braid of Manchester, England. He discovered that a person could be put into a magnetic sleep by being ordered to look steadily at some small object a foot or so from the eye and a little above that organ. To this sleep he gave the name of "hypnotism," from the Greek word "hypnos"—sleep. All these phenomena are now believed to come under the same law—being substantially mesmeric in character. Hypnotism is really the proper scientific term by which all of the class of phenomena of which we are speak-

ing should be known, and it is the term now most generally employed for such purpose.

The Various Stages of Hypnotism.

In this connection it may be interesting to the reader to have the regular sequences of the various stages of hypnotism pointed out, which we will endeavor to do as briefly as the subject will admit. It should be premised, however, that there are some hypnotizers who do not believe in these regular stages. We have already described how hypnotism is produced. The conditions or stages of the mesmeric influence are generally recorded as six in number, and in the following order:

1st. A slight impale, known as wakeful magnetization, in which the person feels a prickling influence much like that felt in a limb "asleep," as it is called; the patient all the while retaining his normal consciousness.

2d. A sense of drowsiness comes over the patient; the pulse falling; breathing quicker, but still conscious.

3d. A state of senseless sleep, wherein he is insensible to the loudest noises, with the nerves of sensation evidently benumbed.

4th. The fourth stage is that of magnetic somnambulism, in which the patient enters upon an apparently new sphere of existence. He has consciousness and sensation, but only toward the operator, whom he hears and obeys. His own senses of touch, taste and smell are dormant. If the operator gives him a junk of fat to eat and tells him it is cake, he eats it, and it tastes to him like cake; he takes water and thinks it whisky, etc. If he is told a stick is a snake, he regards and treats it as such.

5th. The fifth stage is that of clairvoyance. The patient seems to have means of perception unknown in the normal condition of any human being. It is claimed that he is able to see through opaque substances—through walls of wood or stone, even into his own body or that of another, as though the internal parts of the body were set up in a glass case, etc. So remarkable are the asserted phenomena connected with this condition, and so impossible to man in his normal state, that their asserted existence in the somnambulist condition seem impossible to the ordinary mind. It is in this state that the mental faculties seem to be unusually acute, quite supernatural—so much so that a person when so directed can speak with clearness and with oratorical effect before an audience, although in the normal condition he cannot speak in public at all.

6th. There is sometimes indeed a sixth condition which is regarded as an exalted state of the fifth, in which the subject is said to see what is going on at a distance of a hundred miles or more. He also reads the past and foretells the future, etc.

7th. To the above may be added that of mind-reading, to which further allusion will be made at the close of this article. Moreover, if there is any reality in any of the phenomena connected with "spiritualism," as it is called, they may also, with good reason, be relegated to this wonderful principle of hypnotism, of which, like electricity, we see so much and know so little.

It should be added that no precise line can be drawn between these various stages of hypnotism, neither are they all apparent on every occasion; but when they do appear they take about the sequence as above described.

Can the Hypnotizer Give the Power to Hypnotize to Another?

He cannot directly and at once, but the power is one of development. By continual practice, with strong efforts to centralize the will-force on his subject, he can gradually develop the power in most persons to a greater or less extent. But few, however, seem to be so constituted that they can attain any remarkable success in this direction.

Can Any One Hypnotize a Stranger at the Request of a Friend?

If the friend is at a distance and out of sight of the operator, no. The influence must be exerted directly, either by personal contact or the subject must come under the direct action of both the mind and sight of the operator.

Mind-Reading

There is no doubt one of the latest phases of hypnotism. That mind impressions are conveyed from one mind to another, or that one person can read and articulate the impressions made upon the brain of another, is now placed quite beyond successful controversy. But hitherto it has been considered that personal presence of the two was necessary. But as we write, intelligence comes over the wires from Washington, and from very good authority, of certain tests recently made in that city and Philadelphia, which tend to show that mind impressions can be conveyed from one person to another through the medium of the telegraphic wire, without being voiced. At a public exhibition in Washington, a mind-reader, Mr. J. Randall Brown, blindfolded, was at one end of an insulated copper wire, and at the other end was a gentleman whom the audience knew not to be a confederate. Each gentleman held the wire to his forehead, and the one who had the use of his eyes opened a watch and read to himself the figures composing its number. Brown at one end of the wire wrote the figures on a blackboard as they were revealed to the eye and mind of the gentleman at the other end. The fact that the reader unconsciously made one mistake in reading one of the figures serves to add to the claim that intelli-

gence passed from one to the other without words or signals and through a wire. At another test in Philadelphia, made a short time since, ex Governor Pollock of Pennsylvania, who died a few days ago, held the wire in Wilmington, Delaware, while Mr. Brown, who was at the other end in Philadelphia, 25 miles distant, successfully wrote numbers upon which Pollock fixed his mind.

In conclusion we would remark that the main phenomena asserted in hypnotic practice may be set down as indisputable facts. It is, indeed, difficult to conceive the reality of such things, and if we admit them, it is equally difficult to discover any valid reason why developments should stop where they are, or why they should not go on progressing with the ages until humanity has developed powers beyond anything of which, even in its present state of advancement, the human mind can conceive.

GOOD HEALTH.

FOOD AND HEALTH.—The tendency of the age is toward greater refinement in food as in other departments of living, even among the middle classes. In a lecture lately delivered at the Smithsonian Institute on "Food and Health," Prof. Atwater quoted from Sir Henry Thompson as follows: "I have come to the conclusion that more than half the disease which embitters the middle and latter part of life is due to avoidable errors in diet, and that more mischief in the form of actual disease, of impaired vigor and of shortened life, accrues to civilized man in England and throughout Central Europe from erroneous habits of eating than from the habitual use of alcoholic drinks, considerable as I know that evil to be." Prof. Atwater holds that this evil of overeating, he it great or small, is confined practically to the classes to whom generous fortune, unchecked by reasonable restraint, allows it. "There are," he says, "countless sufferers from dietary habits into which self-indulgence has not tempted, but relentless fate has forced upon them. The overfed only pay for pleasure the penalty of pain." Another great cause of stomachic troubles in this country has always been the haste with which food is literally "bolted" by men of nearly all classes. They could not or would not take the time necessary to the proper eating of a meal, preferring to rob themselves of health to rob their business of even a few minutes' personal attention. But we are growing away, slowly, from this bad habit, and the time is approaching when Americans will have good digestions to wait upon appetite.

DON'T SIT ON YOUR SPINES!—"We ought to establish in the United States a school of deportment for public men," says Kate Field. "And the first motto I should hang up over the door would be: 'Don't sit on your spine!' I couldn't help thinking of that as I sat in the gallery of the House of Representatives the day the Chief Justice delivered his oration. In marched the President and Mr. Blaine, followed by the other secretaries, and sat down in the first row of the amphitheater. Sat? Yes; sitting is what it is called. Within five minutes every mother's son of them, with perhaps one exception, had slid down so that his body was supported by his shoulder blades and the small of his back. The justices of the Supreme Court followed, and down they went in the same way. So did the rest of the dignitaries, as busy after being filed in. In contrast with them there sat the foreign ministers and the delegates to the two International Conferences, as upright as ramrods. What made the contrast most disagreeable was the fact that our own great men were by far the best-looking persons on the floor, as a rule. It seemed a pity that they should spoil their fine effect by such an attitude. But it is the common fault of Americans in public places. Congress habitually sits on its four hundred and odd spines when it isn't making speeches or writing letters. Our magistrates do it on the bench. Our legislators do it. Everybody does it."

BLINDNESS FROM INFANTILE NEGLECT.—It is distressing, says London *Figaro*, that out of the 7000 persons blind from their birth in this country who owe their loss of sight to inflammation of the eyes, at least two-thirds of them might now have been in the enjoyment of their sight but for the ignorance or neglect of their earliest guardians. It seems that the remedies for the infantile inflammation which causes blindness are both many and simple. Thus it cannot be too widely made known that the eyes of a newly-born child, if inflamed, should be washed with pure warm water, and that then a single drop of a two-per-cent solution of nitrate of silver should be instilled into each with a drop-tube. In Germany midwives are enjoined to adopt the above remedial treatment, under oath, and since that has been done the decrease in the number of blind children has been most appreciable.

NUTS AS FOOD.—They are indigestible things at best; but if we must eat them, a little salt taken after, either in water or dry on the tongue, will prevent any ill-effects. Nothing we eat needs more thorough mastication than nuts before being fit for the human stomach. If swallowed in too coarse a condition, they are apt to make a short stop in some of the narrower passages of the digestive organs with fatal result.

USEFUL INFORMATION.

Splitting a Grindstone.

A workman was trying to split a grindstone. When a stone is new and four feet in diameter, 10 inches is none too thick, but when that stone wears down to 24 inches it should be split. It is too clumsy, but will make two nice stones if carefully split.

The man in question had drilled a row of holes around the stone, about three inches apart. Ordinary shims and wedges like those used by stone-cutters were put in the holes and driven up by a hammer in the usual way. One wedge was driven a little too hard, and out came one side of the stone, spoiling half of it.

Had that workman had the "know how" he would have turned a deep groove in the stone before it was removed from its former hanging. The groove should be three inches deep, and three-fourths of an inch wide outside, tapering to as narrow as possible to be made at the bottom. This groove done, the shaft and collars to be removed and the groove driven full of dry pine wedges. Put them in carefully, all equally tight. Throw the stone into the water, let it lie over night and it will be split nicely.

The Speed of Grindstones.

The speed for running grindstones is an important practical question. The general impression is that the surface velocity of a large stone can be greater than that of a small one—which differs from the rim of the fly-wheel, because of its being a disk. At the Whitney & Barnes Co., Syracuse, N. Y., where a large number of stones are employed, they run three six-foot stones for the edgers, while they use a mechanical holder for the work at about 2800 feet per minute, and the same stones for hand-grinding about 4000 feet per minute. For Ohio stones a surface velocity of from 2000 to 2500 feet is considered the limit of safety. For Huron stones from 2800 to 3500 is recorded as the limit. The best and most economical speed of grindstones no doubt depends largely on the quality of the stone. The limit of speed for any special variety, diameter and thickness of stones should be thoroughly tested by putting a heavy guard over one, and run on up with graduated speed until it bursts.

HOW TO SHARPEN A RAZOR.—A correspondent of the *Scientific American* writes as follows: Use two hones, an Arkansas oil stone and a fine razor hone. The razor is at first applied to the Arkansas stone, using fair pressure, and finishing with lighter and lighter pressure strokes. Remove razor from the coarse hone to the fine razor hone, upon which oil is also employed. With a few light strokes on the fine hone, an enduring, hair-splitting edge is formed. If the razor be kept on the finishing hone too long, the fine edge will be lost. If this be the case, the process must be repeated, that is, the razor is again applied to the coarser hone and again finished upon the fine hone, care being taken to cease honing after the razor has acquired the hair-splitting edge. Very little practice is required to ascertain when that point is reached, a few hairs of medium fineness supplying the required test. No doubt other instruments requiring very keen cutting edges could also be sharpened in manner indicated. The coarse hone employed should be of sufficiently fine texture to put a smooth edge on a pocket-knife, but not fine enough to give a smooth cutting edge to a razor.

TESTS FOR UNDERWEAR.—A new method of testing woolen garments is by putting caustic soda into a cup of water, and dipping the article whose genuineness is doubted into the mixture, of course being careful not to touch the liquid. The caustic soda will quickly burn animal fibers, but has no effect upon those of a vegetable origin. If the article is all wool it will be dissolved in the liquid, leaving nothing but a track of coloring matter. If the material is cotton it comes out unneathed. When the material is wool supported by a framework of cotton, the latter being indistinguishable to the eye by ordinary test, the caustic soda quickly divorces the two, dissolves the wool and leaves the cotton as clean as if it had been woven by itself. It has been suggested that people might buy a class of underwear made of wool and cotton mixed, that when the sultry days of spring arrive, a bath of caustic soda might be prepared, the garment dipped therein to emerge in the form of cotton gossamer for the summer season.

THE MANUFACTURE OF HAIR CLOTH.—There is no such thing as hair cloth—pure and simple—as the warp is always of some other material, cotton or linen as the case may require, dyed black or such color as is wanted, and sized in the usual way. The looms used are ordinary hand looms. The hair is kept in water previous to its being woven in order to preserve its elasticity. The hairs are caught by a hook on the shuttles and woven one at a time. After leaving the looms, the goods are not calendared in order to give them that characteristic luster.

WHEEL AND AXLE.—The reason why car wheels are made to revolve with the axle and not on it is that the leverage of the wheels over the bearings is less when the wheels are secured to the axles; moreover, this construction is better calculated to withstand lateral thrusts.



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Passing Events.

The news of the strike in the 1700 foot level of the Idaho mine at Grass Valley, though welcome, will scarcely surprise those familiar with this famous mine, which this week declared its 24th dividend. This is the most promising gold mine in the State.

Trouble has been expected in the Old World and in the East on May 1st, Labor Day, over the adoption of the eight-hour rule. We go to press too early to state whether these fears have been realized or not. Locally, however, there has been no trouble. The carpenters have carried their point without active opposition and other trades are expected to follow.

The advance in silver makes it within the possibilities that many closed-down mines on this coast will resume operations shortly. Even with a slight recession in price many of them could now go on with profit. The discount is still large, but nothing at all to what it has been.

There is little or no change in the situation as regards the local molders' strike. It is thought that the foundry strike in Chicago, however, may have some effect on affairs here.

MINING COMPANY'S BOOKS.—W. W. Hickies, president of the Ithaca Gold and Silver Mining Company, who several weeks ago was convicted by a jury in Judge Rix's court of misdemeanor, in refusing to permit some of the stockholders to examine the company's books, has been fined \$500, with the usual alternative of imprisonment.

Duping Inventors.

A case is on trial in this city where a man calling himself a "patent agent" is accused of using the mails for improper purposes and swindling inventors.

Two or three men went into a partnership under a high-sounding name, with the ostensible business of selling patents on commission. Their method of operation was to take each week the names of patentees from the Official Gazette of the U. S. Patent Office, send them a circular and offer to sell the patent-right for the Pacific Coast for them.

Shortly after they would write and say (or intimate) that a purchaser has been found, but that it would be necessary to have \$18 or \$20 to search the title, etc. If the money was forwarded, as it often was, the inventor could never get any further word from these so-called "patent agents."

This concern was started as far back as 1886, and although there have been many complaints, the men have usually been able to get clear and continue their nefarious work.

The testimony in this case is to the effect that in the four years in which they were in business they had only sold three patents and could not even recall what they were. One of the employees testified that not a single customer was ever seen to enter the office to inquire about a patent or examine a model. The whole business consisted in writing letters to those who desired to sell.

No hooks or records were kept of any transactions. Not a single letter could be shown from the authorities at Washington in relation to patents. It could not be shown that a single search had ever been made of the titles of any patent whatever.

In the circulars it was stated that each patent for sale would be advertised in 100 newspapers, but this man could not give the name of a single paper in which any advertisement of the kind had appeared. Nor could he remember the name of more than one person, a resident of this city, who had ever called at his office on business connected with the purchase of a patent.

It was also shown that one of the employees had been asked to pose as a capitalist desirous of buying patents, he being assured that the victims were generally poor and not liable to go to the expense of prosecution.

It is outrageous that such an institution as this could have continued business as long as it has without its projectors being taken by the strong arm of the law. Such men are the worst kind of swindlers, taking as they do the money from poor but confiding inventors. People who intrust their patent business to others should inquire carefully as to the standing of the firm before doing so.

The Advance in Silver.

The steady advance in the price of silver is of the greatest importance to the silver miners, and they greatly rejoice. The white metal has been depressed in commercial value for a long time, resulting in the closing down of hundreds of mines on this coast and also great loss to many working mines. The discount has been so heavy that low-grade mines had no chance for any profit at all. The big silver mines, producing largely, have severely felt the effects also. Now, however, that it has gone above the dollar mark once more, many mines will doubtless resume operations.

To the State of Nevada, in particular, this increase in the value of silver is of the greatest possible interest. Mining matters there have been dull for a long time. Colonel S. Wenban, a prominent Nevada silver miner, says: "This sudden rise in silver is giving a great impetus to the mining business, especially in Nevada. The boom has struck us in earnest, and there will be a general increase in the product of every silver mine in Nevada and California. To-day silver reached 105. If it goes up to 110 the result will be that the mining interests of this coast will be doubled at least. It will make a boom that will mark a new era on the coast and create a better feeling in all circles of business. There are lots of mines in both Nevada and California that are lying idle simply because the owners cannot obtain the necessary capital to work them. But the outlook now is excellent. Things are brightening up, and I expect to see the highest mining time ever seen on the Pacific Coast."

Eight Hours of Labor.

Thursday, May 1st, was the day set under a general plan by the labor unions of America and Europe to inaugurate the eight-hour system of labor. In Italy, Germany and Austria, troops have been held in readiness to suppress disturbances. In the cities of London, Paris, Vienna and Glasgow, labor demonstrations have been kept in check by the authorities. In this country, although there are prevailing strikes of more or less magnitude in Chicago, Boston, Philadelphia and San Francisco, there has been no trouble and none of a violent character is anticipated.

In the United States the building trades are to inaugurate the system, when others will follow. With us in San Francisco and Oakland the eight-hour demands of the carpenters, plumbers, lathers and gasfitters have been conceded by the contractors without any contest.

The iron trades on this coast, including molders, patternmakers, machinists and boiler-makers, are prepared to exact an eight-hour work day when their Eastern brethren fix a date. The National League Conventions of the various branches of the iron trades will be held within the next six weeks. Each will fix the date when its members shall exact the enforcement of the eight-hour system.

The men employed in the planing-mills on doors and blinds will make their demand for an eight-hour day on July 1st. The painters and decorators have set their day for June 1st, and the stair-builders will soon follow.

The United Brotherhood of Carpenters and Joiners was selected to make the first move in obtaining the short day in the United States. The membership of this organization is 65,000. Many other trades have joined this body to attain the same object.

It is natural to suppose that unless these demands are conceded, there will follow a greater strike than has been known before. Already contractors here, in order to protect themselves against the emergency of a general strike, insist upon a "strike clause" in their contracts, providing for an extension of time.

A manifesto issued by the American Federation of Labor orders all labor unions outside the building trades to refrain from sympathetic strikes for the present, letting the first test fall upon the holding trades. In the large cities of this coast the men carried their point without active protest, and there has been no trouble whatever.

MECHANICS' FAIR POSTPONED.—The Trustees of the Mechanics' Institute have issued the following statement: The Board of Trustees of the Mechanics' Institute beg to announce to their many patrons and exhibitors that, in compliance with the request of the Society of Pioneers, the Native Sons of the Golden West and many of our most prominent citizens, we have granted them the use of the Exposition building on the 8th, 9th and 10th of September for the purpose of celebrating the fortieth anniversary of the admission of California into the Union. This necessitates a postponement of the opening of our annual fair, and the Board of Trustees have decided to open the Twenty-fifth Industrial Exposition on Thursday, September 13th, and close Saturday, October 25th. The machinery department will be open for the reception of goods on and after Sept. 1st and the main building on and after Sept. 12th.

THE STEWART MINING BILL.—Mr. A. C. Light of Taylorville, Plumas Co., writes us as follows: "I am entirely opposed to having our mining law changed from January 1st to the 1st of October or to any other day. No matter what the date may be, the miner has just as many clear days to work out his assessment during twelve months. On the whole, Mr. Stewart's proposed amendment will do more harm than good, not only to the miner, but to all other classes. To use a common phrase, I think Mr. Stewart 'don't know beans.'"

UP at Spokane Falls they are talking of making a magnificent mineral palace, similar to that at Pueblo, Col. The structure will be used as an exhibition building for the various mineral and other products of the great Northwest and will be built entirely of galena and other ores taken from mining camps tributary to Spokane Falls.

Grand Canyon of the Colorado.

NUMBER IV.

Wherever we reach the Grand Canyon on the Kaibah division, it hurls upon the vision in a moment. In the Kaibah the forest reaches to the sharp edge of the cliff, and the pine trees shed their cones into the fathomless depths below. The scenery of the amphitheaters far surpasses in grandeur and nobility anything else of the kind in any other region, but it is mere by-play in comparison with the panorama displayed in the heart of the canyon. The supreme views are to be obtained at the extremities of the long promontories which jut out between these recesses far into the gulf.

In these amphitheaters, one cannot fail to be much impressed with the intricate and yet systematic manner in which the ground plan of the walls is laid out. Great alcoves and cnsps are formed, and wherever the wall makes a turn, it is by a well-rounded inward curve or by a sharp cusp-like projection. The architectural details are always striking, and by their profusion and richness suggest an oriental character.

In Mr. Dutton's description of the scenery in the Kaibah, he says: Crossing the park, and ascending the heights upon the east, we once more descend into a rather deep ravine of the usual type. Upon its bank the trail passes by a small trickling fountain, known as Thompson's spring. A basin has been dug and made water-tight to save the scanty supply of water. The water is excellent and this is an important camping-place.

From this point we may visit many interesting localities. Following downward the main ravine about five miles, we find it at length betraying evidence that it is near the brink of some amphitheater. Climbing the steep bank to the main platform, 300 feet above, we move toward the southwest, and in half an hour more are upon the verge of one of the finest and perhaps the most picturesque of the gorges of the whole Kaibah forest. It is a tributary of the Bright Angel amphitheater, and has been called by us "The Transsept" (see engraving). Though only of the second or third order of magnitude among the lateral excavations of the Grand Canyon, it is far grander than the Yosemite. At the very head of this gorge the walls plunge downward at once more than 3000 feet.

As the gorge deepens toward its junction with the main amphitheater, the aspect of the lateral walls, as they recede from us, becomes most imposing. The details of their sculpture are very beautiful and thoroughly systematic, and every characteristic is sustained throughout their whole extent. The entire length of the chamber is seen in perspective. Beyond its opening we see the grandeur of the central canyon with huts beyond huts, and the vast southern wall of the main chasm in the background 15 miles away. To many spectators the dominant thought here might be that this stupendous work has been accomplished by some intelligence akin to the human rather than by the blind forces of Nature. Everything is apparently planned and out with as much definiteness as a rock temple of Petra or Ellora.

LEAD ORES.—Assistant Secretary of the Treasury Tichenor has informed the United States Consul at Paso del Norte, Mexico, that in case of ores composed of silver, gold and lead, where the silver and gold together are of chief value, the ore would not be dutiable; but where the lead is more valuable than either of the others separately, the ore would be dutiable under the provision of the law for lead ores. The term "chief value" of an article or substance composed of three materials means greater than either of the others and not greater than their aggregate.

THE Regan Vapor Engine Co. of this city have recently elected Lney N. Smith president in place of Francis Cotting. In this engine the carburetor contains a small quantity of gasoline. At each revolution of the fly-wheel, a current of cool air is driven through the carburetor and into the cylinder. In passing through the carburetor it vaporizes a quantity of gasoline, and the vapor is ignited by an electric spark, developing the power. The engine is useful for many things, and especially so for small steam launches.

THEY are talking of holding an iron pier out into the ocean from Coronado Beach,

Quicksilver Mines.

Mode of Occurrence of the Ore.

The New Almaden, Enriquita and Guadalupe mines lie nearly south of San Jose, Santa Clara county, in this State. The district has been much more productive of quicksilver than any other in North America, and since 1850 has yielded about four-fifths as much metal as the

deposits themselves are of various types. The commonest is the reticulated mass, consisting of irregular bodies of broken rock into which solutions of cinnabar and gangue minerals have filtered, cementing the fragments together with ore. Where the disturbance has been less extensive and irregular, clean-out fissures may sometimes be seen filled with ore, and these can only be classed as veins though they are

been surveyed with the utmost care by the officers of the Quicksilver Mining Co., and data exist for the construction of any desired sections. Two sections, here reproduced, show the structures.

Fig. 1 shows a section taken along the course of the south group of horsting. The line on which the section is made was selected with a view of illustrating the continuity of ore from

below, because the tenacity implied in the movement of the entire hanging country without fracture would be improbably great even were the rock much firmer than the materials of which the Coast Ranges are chiefly composed. Such a fissure intersecting the hanging country really exists, and a trace of it may be perceived on this section from the 1500-foot level downward, where the slopes show that the ore



Fig. 1.—UNDERGROUND SECTION OF NEW ALMADEN MINE, SANTA CLARA COUNTY CAL.

Almaden of Spain. The general geology of the district presents one special feature of geologic interest in the occurrence of rhyolite, a lava not yet recognized at any other point on the Coast Range. Otherwise the geology presents no novelty. The great opportunity which the district offers is for the study of structure dis-

not persistent. Impregnations also exist where the ore-bearing solutions have encountered permeable sandstones.

From any one accessible slope of the New Almaden mine it is evident that the country has been intersected by fissures, that energetic motion has taken place along these fissures,

the surface at the top of Mine Hill to the lowest workings. The group of ore bodies thus intersected is for the most part distinct from that to the east of the Randol shaft. It is manifest from this section that a fissure extends from the lower workings to the top of Mine Hill, a vertical distance of about 2000 feet, and

occurs on parallel lines. The line of the northerly slopes in this region, if continued upward, would reach the surface near the point at which the Randol shaft appears projected.

Another view of the two fissures is shown in Fig. 2, where they are intersected by an east and west vertical plane. To the right appears the south ore-channel, including the O'Brien, Don Frederico and other bodies; to the left is the north fissure.

The existence and position of the two fissures are not so evident and clear as would appear from the foregoing notes. The ore bodies lie upon complex curved surfaces. The result is that no vertical plane intersects both fissures at right angles throughout, and no single section affords indubitable evidence of two fissures. Views similar to what is shown in the section might be given along a single doubly-curved surface. Could one but represent the fissures by contours, the entire structure would be shown in three dimensions and would not be ambiguous. The fissures are marked by clay seams or alae.

Between the two principal fissures a wedge of country rock exists. It is not uncommon for great masses of this description to be inclosed on both sides by ore-bearing fissures. Such was the case in the Comstock and also in the Ruby Hill mines at Eureka, Nev. Ground thus inclosed is seldom solid, and subsidiary fissures leading into it are often ore-bearing. In the New Almaden mine the ore is not confined to well-defined fissures. It is true that ore can be followed from the top of Mine Hill downward to a depth of 1600 feet practically without a break; but the sections show that at many points the fissures are systems of associated openings rather than simple ruptures. The wedge of ground between the principal fissures is not a solid mass, and subordinate fissures and ore-channels exist in it.

The Fox Platform and Coupling Co. has applied to the Superior Court for permission to dissolve the corporation in pursuance of a resolution adopted by the stockholders.

The southern mining districts along the Carson & Colorado R. R. are all exhibiting considerable activity. Interest is principally centered on Cerro Gordo and Sylvania.

The statue of James W. Marshall, the discoverer of gold in California, is to be unveiled on Saturday, May 3d, at Coloma.

NICKEL ORE is to be placed on the free list.

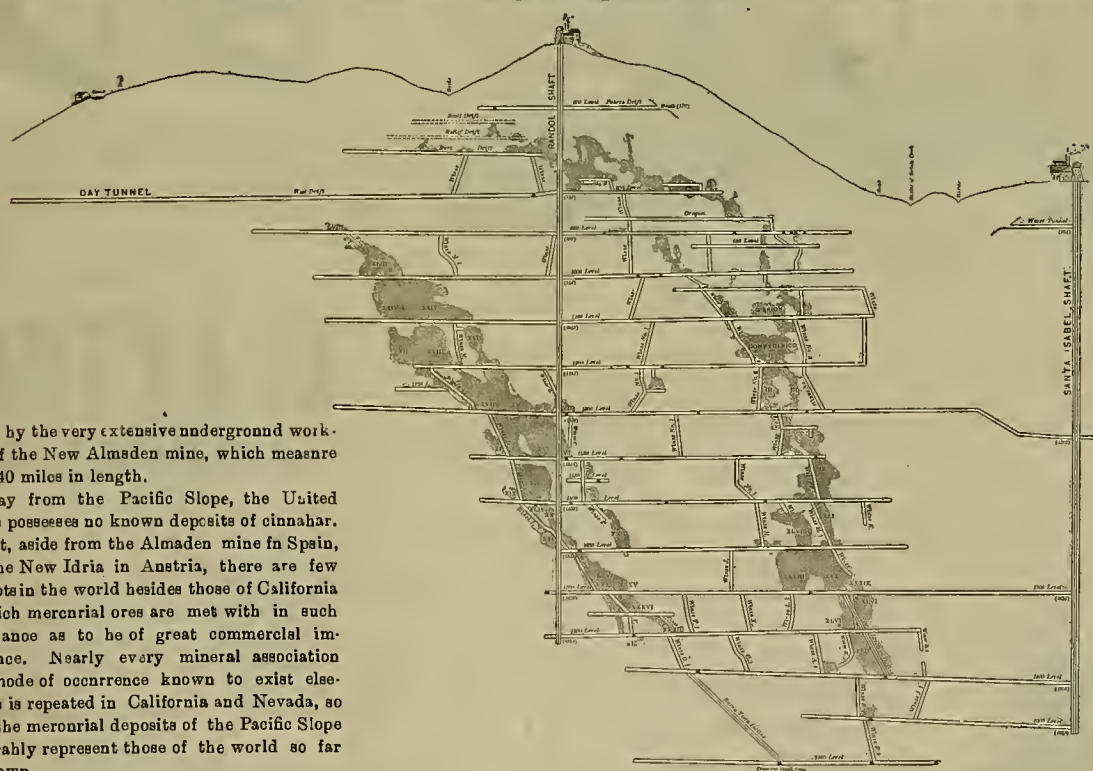


Fig. 2.—EAST AND WEST VERTICAL SECTION, NEW ALMADEN MINE.

closed by the very extensive underground workings of the New Almaden mine, which measure over 40 miles in length.

Away from the Pacific Slope, the United States possesses no known deposits of cinnabar. In fact, aside from the Almaden mine in Spain, and the New Idria in Austria, there are few districts in the world besides those of California in which mercurial ores are met with in such abundance as to be of great commercial importance. Nearly every mineral association and mode of occurrence known to exist elsewhere is repeated in California and Nevada, so that the mercurial deposits of the Pacific Slope admirably represent those of the world so far as known.

The New Almaden is the most important quicksilver mine in the United States and has always been the greatest producer. In Monograph XII of the U. S. Geological Survey, "Geology of the Quicksilver Deposits of the Pacific Slope," by Geo. F. Becker, considerable space is devoted to consideration of the structure of this mine. Prof. Becker's conclusions with reference to the ore bodies in the mine are of great interest. Some of his statements in this connection are here given.

While the evidence of the existence of a fissure system is, if possible, more abundant in the New Almaden mine than in most other quicksilver deposits of the Pacific Slope, the

that the adjoining rock masses have been shattered more or less irregularly, and that solutions entering the ground have deposited ore in such spaces as were vacant. It is also apparent from the relations of the ore to the clay that the solutions have entered from below, and it is almost a necessary inference that the fissures served as channels of ingress for the solutions. These conclusions may be drawn in each of as many chambers as the observer can reach, and he will find nothing to conflict with them in any portion of the mine.

The surface and workings of the mine have

that the ore has been deposited almost continuously along its entire course. This fissure is remarkably sinuous in vertical section, and a long tongue of ground north of Mine Hill has manifestly moved northward sufficiently to leave space for the deposition of the ore.

If one considers the character of the disturbance to which the fissure must owe its origin, it appears almost certain that this tongue of country rock overlying the fissure cannot have remained intact. One would expect to find one or more fissures intersecting it in a direction more nearly vertical than the south ore-chan-

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We invite the acquaintance of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

Remittances of money, made by individual inventors to the Government, sometimes mislaid, and it has repeatedly happened that applicants have not only lost their money, but their inventions also, from this cause and consequent delay. We hold ourselves responsible for all fees intrusted to our agency.

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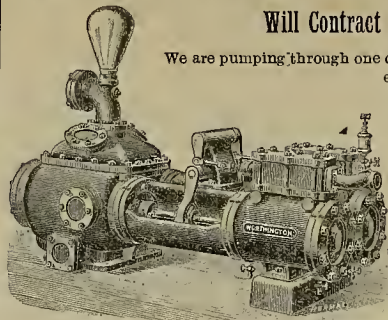
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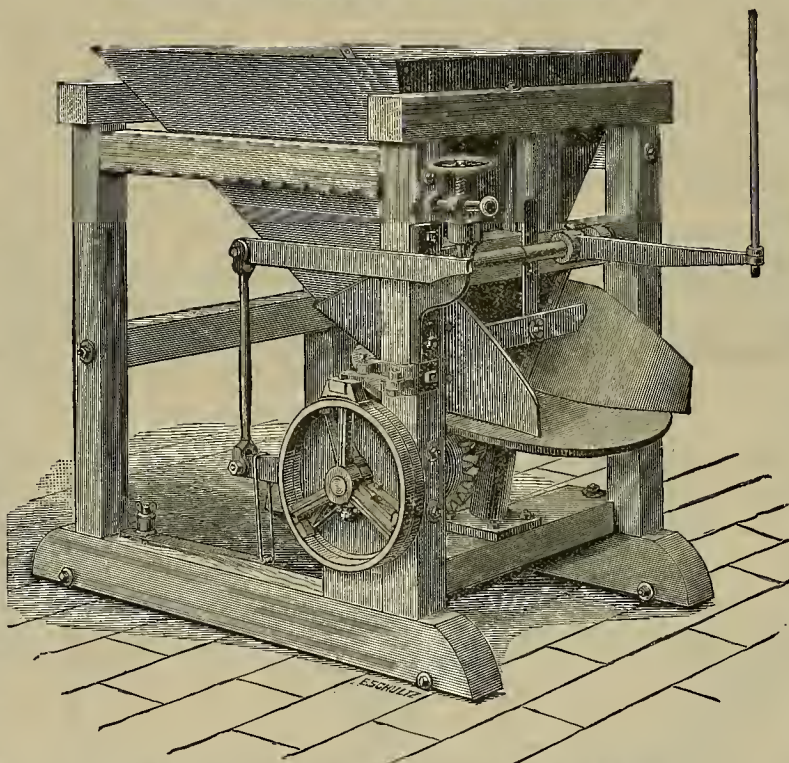
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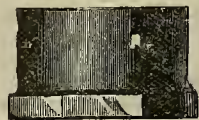
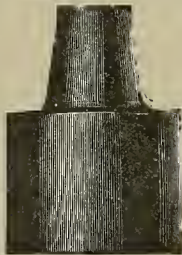
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Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working samples, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protochloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Patchen's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the titles Smelting, Mexican process, Chilean process, Kroschke's process, etc. Under "Pulverizing Machines" are described the anatomy and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing harrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

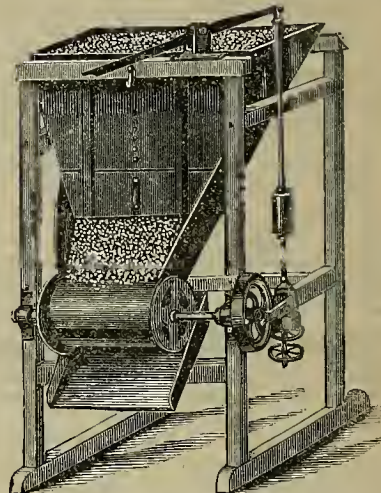
In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg harrel, cheap barrel trough, barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improvised retort, roasting furnace, furnaces tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tailings, and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

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Coast Industrial Notes.

Two oil companies of Ventura county are paying dividends.

The *Merced Express* says the crying want of that place is a good flouring-mill.

The wool clip of Otay Valley, San Diego county, to date weighed 133,500 pounds.

LOCAL capitalists at Tacoma have secured a piece of land for building a large dry-dock.

A SHINGLE MILL at Hood River, Oregon, has bolts enough on hand to cut 7,000,000 shingles.

NATIONAL CITY, San Diego county, has an olive oil mill that will soon be handling 32 tons a day.

The miners about Colton are trying to induce some capitalists to erect reduction works at that place.

The President has signed the bill by which \$200,000 is appropriated for the erection of a public building at San Jose.

The rise of silver quotations has caused the small mining claims to operate. Should silver rise to 115, the Comstock and surrounding deposits will probably boom.

SACRAMENTO salmon cannerymen have about decided to close down, owing to a strike among the fishermen at Martinez who have demanded two and one-half cents a pound for fish.

A LARGE SCHOONER left Los Comas, Oregon, last week with 300,000 feet of lumber for San Luis Obispo. This was the first deep-water vessel that loaded at that place.

A COMPANY has been organized to make compressed blocks of San Luis Obispo bituminous rock for street purposes, and works are being erected. Each block is formed under a pressure of 115 tons.

The Ventura county supervisors have passed an ordinance that compels owners of ditches and flumes to put wire screens at their mouths to prevent fish from being drawn away from their native streams.

THREE salmon canneries on the Columbia river are running, notwithstanding the strike. Non-union men and ranchers furnish the fish, which are in plenty. The fish-wheels at the Cascades are doing well.

A VALUABLE iron mine was recently discovered in the Capelle valley in Napa county. Preparations are being made by parties interested to work the mine. The ore will be hauled to Napa, then shipped to San Francisco.

The bituminous rock teamsters have formed a union at Santa Cruz, owing to two companies reducing the price per ton for hauling from \$2 to \$1.75. The teamsters say they will quit work if the original price promised them is not given.

NEWS was received at North Yakima, Wash., on Saturday, that enough bonds were sold in New York to insure the completion of the big canal and irrigating works. The bonds were guaranteed by the Northern Pacific Railroad Company.

TWO and three-fourths miles of jetty at the mouth of the Columbia river have been completed, leaving one mile and a quarter to finish the work. Since July, 1889, 7580 feet of extension have been made, and the amount of filling has been 750 tons of rock.

J. V. B. McCURDY is the patron of Queen City, Paradise Valley, Nevada. He owns the only house in the place. It stands in the center of a 5000-acre tract, which is inclosed with a seventeen-wire fence, rabbit-proof. Inside this fence roam some 3000 Angora goats headed by thirty prize colliers.

CAPTAIN JOSEPH BERRY, the veteran millwright, has just completed building a four-stamp mill for Fisher in Sixmile Canyon, Nev., west of the site of the old mill. The new mill is operated by an overshot wheel 33 feet in diameter, with a belt pulley 22 feet in diameter. The mill is now crushing ore from Cedar Hill croppings. The mill has a crushing capacity of eight tons in 24 hours.

A LARGE quantity of Amador county sandstone is being shipped to Stockton to be used in a new church there. The work of filling a large contract for the mansion of young Crocker will be commenced shortly. The mansion is intended to be one of the finest in San Francisco. Lone sandstone is now known all over the coast and is classed as the very finest of building stone. It is reported that a force of fifty or more men will be employed at the quarry during the coming summer.

A LARGE deposit of gypsum is reported in San Bernardino county, in the foothills east of Grayhawk mountain, and about sixteen miles northeast of Whitewater. The principal uses of gypsum are for plaster of Paris (by calcining) and fertilizer. The find is ten miles from present railroad communication and the survey for the proposed Union Pacific extension runs within a quarter of a mile of it. The finders, W. D. Barsley and M. L. Wilson, hope to enlist the co-operation of capitalists in developing the ledge, which is said to be very wide.

THE Southern Pacific Co. spends a great deal of money for coal. The average cost of coal to the company for the Pacific system has been about \$6 or \$7, and 75 cents a ton duty has been paid for years on the largest part of what has been used. The company has two colliers, the San Pedro and the San Mateo, engaged in bringing coal from Puget sound to San Pedro and San Francisco, and will soon have in operation the largest collier on the coast. Mr.

Huntington recently purchased the San Benito, an iron steamer in the European trade, which is now being changed for coal carrying at Newport News on the Atlantic Coast. Its capacity is 4500 tons dead weight besides its bunker coal.

THE Southern Pacific Co. is about to build erecting works at Oakland to replace those recently burned at San Pedro. The erecting tanks and a good deal of the machinery can be so repaired as to be used again and will constitute a part of the new works. The new plant will be located near the foot of Peralta street and near the present ferry-slips for the freight steamers. In the future all the piles used in the company's wharves about the bay and at San Pedro will be treated to the creosote process here. A great deal of the bridge timber used by the company is also treated to this process. The erection of the works in Oakland will represent an investment of about \$25,000.

THE Salinas natural gas well is well started and everything is working in first-class order. It has reached a depth of 83 feet through the following deposits: Alluvium, 4 feet; yellow clay, 6 feet; yellow sand, 8 feet; yellow clay, 3 feet; yellow quicksand, 18 feet; yellow clay, 16 feet; blue sand, 5 feet; blue clay, 10 feet; yellow clay, 10 feet; brown vegetable mold, 3 feet. At the depth of 70 feet, after passing through the stratum of blue clay, which turned to yellow near the bottom, the first gas was struck but not in very strong volume. At the depth of 83 feet a strong flow of gas was struck, but the well soon filled with water from below. From a depth of 39 feet to the 83-foot point, no water was found.

FOR the first time in its history the Southern Pacific Company has suffered damage to its property from an earthquake. When the hardest of the shocks of last week occurred, the iron truss railroad bridge over the Pajaro river on the coast division was moved out of place about a foot, preventing the passage of trains. During the morning passengers had to walk across the bridge and take trains sent to meet them. The bridge remained on its stone piers and was safe after the rails were moved into line, which was done. The bridge is near a fissure through the mountains through which the Pajaro river runs, and the earthquake caused the river to rise four feet, and made long rents in the mountain-sides near by.

THE Consolidated Piedmont Cable Co. has been formed in Oakland. This new corporation has a Board of Directors composed of Daniel Meyer of San Francisco, Ira Bishop, representing Charles Bishop, hanker, Honolulu, Mrs. Phoebe A. Blair, relict of J. Walter Blair, Samuel and Montgomery Howe, E. A. Heron and W. B. Morse. Fifteen and one-half miles of cable road are to be constructed. This new organization absorbs the following horse-car lines: Washington street via Fourteenth street and Broadway, to Piedmont and the cemeteries, Washington street via Fourteenth street to Watts' tract; Sixteenth-street depot and Seventh street, West Oakland; also the Market street and Adeline street feeders. When the system is blended, as it soon will be, transfer tickets will be issued. Just now the Piedmont section, running on Washington, Fourteenth and Broadway, is being converted into a cable road. About 300 men are at work on that job.

THE *Virginia Chronicle* says: John W. Mackay is at the head of the movement for the proposed reduction in handling Comstock ore after its extraction from the mines. The Comstock Tunnel Company officials have intimated a willingness to agree to a reduction in royalty, provided the V. & T. railroad and mill companies consent to reduce the cost of transportation and milling. That the latter will be forced to either consent to the reductions proposed or suspend ore shipments and hang up their stamps there can be no question, as it was demonstrated at the conference that the vast low-grade ore resources of the Comstock must remain in the mines if the present rates for handling are maintained. On the other hand, if the proposed reductions are consented to, the hullion yield of the lode will be increased to double the present average, thereby furnishing a larger revenue for the railroad and mill companies and giving employment to double the present force of miners and millmen.

IN consequence of the severe winter season, dull market and the usual depletion of the great streams flowing into the Pacific, the salmon pack this year is likely to be materially curtailed. It is thought that it may require one or even two years of recuperation, owing to the dullness of the market, before the haul is pushed to an extent equal to the two years last passed. John T. Cutting, in speaking of the salmon business, said: "The Sacramento canned salmon has ceased to cut any figure in the market whatever, owing to the almost utter extinction of the fish in its waters. The Columbia river also has lost the commanding position it once held in the market, owing to overfishing, and now that ample supplies can be procured from Alaska and British Columbia, the product from the Columbia has ceased to exert the influence upon the market that it did. The situation on the Columbia can best be shown by considering the decreased number of the canneries at work on that stream. In 1889 there were twenty-five, this year the number will not exceed fifteen, and of this number there are now only one or two of the upper river canneries in operation."

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING APRIL 22, 1890.

425,972.—CLOSET ATTACHMENT—R. V. Baraco, Fresno, Cal.

426,167.—WAVE MOTOR—E. Chaffey, Santa Monica, Cal.

426,245.—ORE FEEDER—L. D. Craig, S. F.

426,267.—FRUIT PICKING STAND—J. C. Greenlow, Pepperwood, Cal.

426,016.—KEY FASTENER—W. W. Hitchcock, Los Angeles, Cal.

426,017.—HYPODERMIC SYRINGE—W. W. Hitchcock, Los Angeles, Cal.

426,033.—AUTOMATIC FLUSH TANK—A. Mayer, Pasadena, Cal.

426,034.—AUTOMATIC FLUSH TANK—A. Mayer, Pasadena, Cal.

426,208.—SACK HOLDER—Alex. McDonald, Franklin, Cal.

426,312.—RETAINING DEVICE FOR OVERSHOES—J. A. Patton, San Diego, Cal.

426,280.—ANVIL ATTACHMENT—C. M. King, Downieville, Cal.

426,025.—FLOOR TIGHTENER—W. P. King, Los Angeles, Cal.

426,352.—SHEET-METAL FOLDING MACHINE—S. F. Woodward, Clapper Gap, Cal.

The following brief list by telegraph, for April 29, will appear more complete on receipt of mail advices:

California.—J. G. Eastland, assignee of a one-fourth interest, S. F., fire alarm; Albert A. Weber, Sacramento, self-oiling car axle; William P. Walling, Santa Monica, elevated cable road; George W. Thurston, S. F., fruit-drier; Thomas A. and H. W. Perlan, Sacramento, dish-washing machine; Samuel H. Pratt, Strawberry Valley, lung-testing toy; William B. Peters, S. F., assignor of a half interest to R. C. Sargent, San Joaquin, dredging machine; Radford W. Peterson and S. B. Clark, Santa Rosa, top-pickler; Thomas Isaac, Sacramento, calipers or dividers; Daniel F. Jones, S. F., safety plug for wash basins; James Kelly, assignor of a half interest to E. Dougherty, San Diego, vent-stopper for ordnance; same, device for laying guns at any angle; William H. Grissim, Santa Rosa, measuring funnel; William Holland, Gilroy, shaft for vehicles; Peter B. Donahoe, Fresno, watering-cart; Charles F. Elliott, S. F., method of and apparatus for purifying water for boilers; Edward A. Cochran, assignor of a half interest to C. A. Sawtelle and E. J. Beach, Pasadena, horse-clipping machine; Jessie Buody, San Rafael, mixer-box; Frank Bardez, S. F., faucet-filter.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Handling Comstock Ores.

EDITORS PRESS:—Your correspondent is here looking around the mines. Since this city has fallen under control of the low-grade millmen, the monotony of life is only equalled by the quietness of its surroundings. An occasional break to the stillness is had when one of the numerous superintendents returns for a brief visit from his foreign travels.

Mr. Pat Kirwin, Supt. of the Gould & Curry, put the town in a flutter this week by his unexpected arrival from Mexico, where he and the president of the company have been luxuriating. No wonder the mines are assessed in place of paying dividends.

A mining man of Gold Hill is responsible for the information that the Overman has a ledge of good ore on 1200 level which has been sampled across the face and found to be 12 feet wide; these samples show an average of \$32.50 per ton. By mixing this with stuff containing little or no mineral, the battery samples are reported to stockholders to be around \$17 per ton. Universal dissatisfaction led to be heard on all sides against the complete silence of the *Virginia City* press upon these too apparent subjects of millmen handling the ores, hot at the mine and at the mill, with no check upon their acts. Everything is shaped to fit the mills. I am told that most of the Gold Hill mines do not consider it necessary to make mine assays for the benefit of their stockholders, but simply dump their ores to the mills. The question of quantity and quality is of little moment to them, so long as the mills are kept running. A radical change must take place, or dividends will never be paid on these mines again. Freight and milling should be reduced. But these are very small items when confronted with the fact of the very imperfect system of checks, as existing between the mine corporations and the mill corporations. They are both incorporated under the laws of California, and the barefaced violations of the laws made to govern such corporations by your State should not be permitted another day.

The stockholders interested in the mining corporation are sacrificed upon every side by their agents for the benefit of stockholders interested in mill corporations. Just why this should be allowed to continue when a half-million of our California and Nevada people have greater or less interest in these mines is a profound mystery. The violation of the law is to be met in every mining corporation that refuses to keep a proper check on ore shipped to mill and its value. The manipulation of freight bills on ore—all in favor of the mill corporation—is costing the mining corporations thousands of dollars yearly. This freight is another very small item when compared with the manipulation of ore assays, all of which favor the mill corporation to the loss of the mine. Again, the mill corporations are allowed to keep all tailings and slimes, which, if the truth be told, are altogether too valuable to be surrendered so willingly by the stockholders of the mines.

Most of these mines could pay dividends today if they were honestly and economically worked. Until the same respect is paid for the

mine stockholders' property as is now given to the mill stockholders your readers can expect no dividends from the Comstock mines. X. Virginia, Nev., April 26th.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none out worthy men.

J. C. HOAG—San Francisco.
R. G. BAILLY—San Francisco.
E. B. BUCKMAN—Santa Cruz Co.
SAMUEL CLIFF—San Luis Obispo Co.
C. J. WADSWORTH—San Bernardino Co.
W. W. THOMAS—Los Angeles Co.
E. B. TAYLOR—San Joaquin Co.
JOHN B. HILL—San Diego Co.
E. H. SCHAEFFER—Camarillo and Tuolumne Co's.
FRANK S. CHAPIN—Colusa and Tehama Co's.
W. B. FROST—Merced and Stanislaus Co's.
GEO. WILSON—Sacramento Co.
T. M. STARKES—Sierra Co.
H. KELLEY—Modoc Co.
H. B. PARKER—Del Norte Co.
WM. H. HILLMAN—Oregon.
H. G. PARSONS—Oregon.
R. G. HUSTON—Montana.

Attention, Southern California Miners.

WORKS FOR SALE.

The Works are situated at Daggett, Cal., in the Calico Mining District, and on the side-track of the Atlantic and Pacific Railroad. They contain a first-class 50-horse power Engine and 45-horse power boiler, with Ore Crusher and other machinery, Mill Scales, Assaying Outfit, etc., all nearly new. Also upon the premises an office building and a comfortable dwelling-house (portable). The above can be had at a bargain. Apply to GILLISPY & CHILDS, 123 California St., San Francisco.

CHEAP AND CONVENIENT CHAIN PULLEY

The engraving herewith illustrates a new lifting apparatus of that kind in which great power is necessary, and which will stand and hold the load at any point where it is left. As the engraving shows, there is a pulley over which the lifting chain passes, and upon the same shaft two gear wheels, so fixed that their teeth alternate—that is, the teeth of one wheel correspond with the spaces of the other. The pulley on the right, over which the endless actuating chain passes, is fixed to a shaft, which has short crank arms formed upon it, correspond with the gear wheels and with the size of their teeth, so that when the shaft is rotated the crank arms or pins engage the teeth of the gear wheels, one after the other, and thus advance the chain pulley. This device also forms a perfect lock when left at any point.

The hoisting-chain pulley, placed between the large gear wheels, brings the weight right under the supporting-hook and balances the machine. The operator may stand on one side and haul on the chain and need not be right under the apparatus. The device is simple, compact, strong and efficient, and is quite ingenious in design. These machines have lately been put on the market and are made here. The invention evidently improves, in a large degree, the construction of differential chain pulleys, makes them less in cost, weight, wear, and repairs, and easy of handling and operating. The new device is worthy of the attention of manufacturers and all users of such articles. The size for a half-ton lift weighs only about thirty pounds.

AGENTS WANTED.

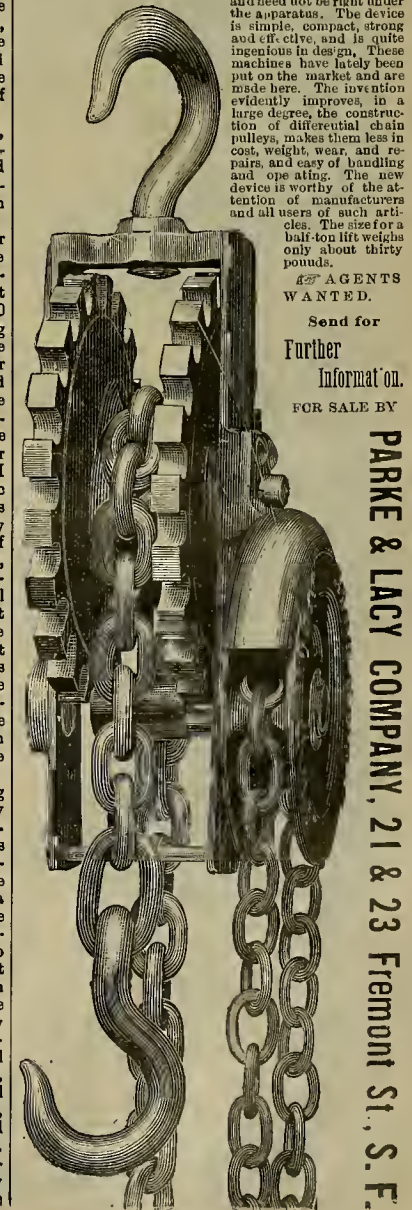
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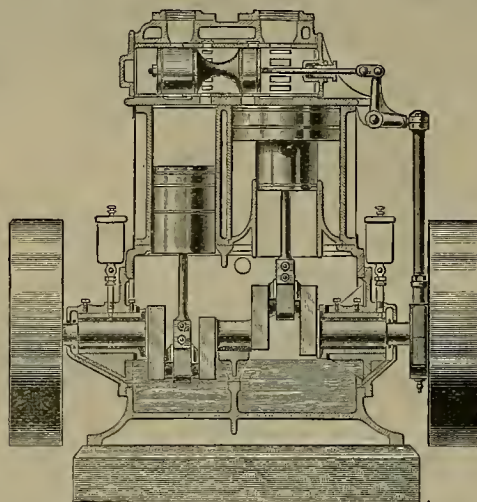
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GREATEST CAPACITY OF ANY CONCENTRATOR MADE,

One Machine Taking Pulp from 10 Stamps.



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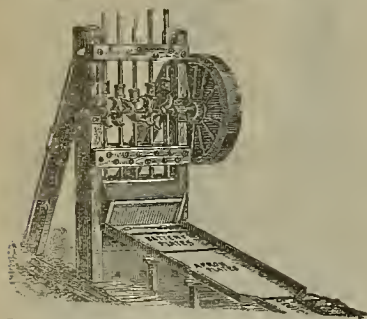
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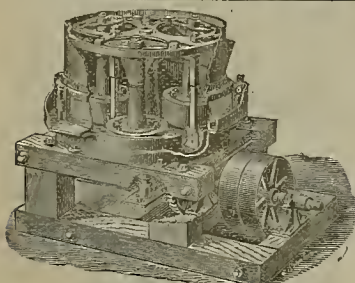
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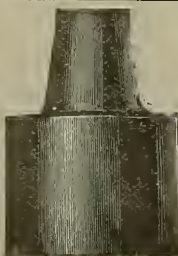
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N. B.—CHAPPELLE, Butte Co., Cal., Nov. 10, 1889.—Mr. Jas. Day, Chico: The little mill is a daisy; it comes up to all expectations; it works perfect in all respects. Yours truly,
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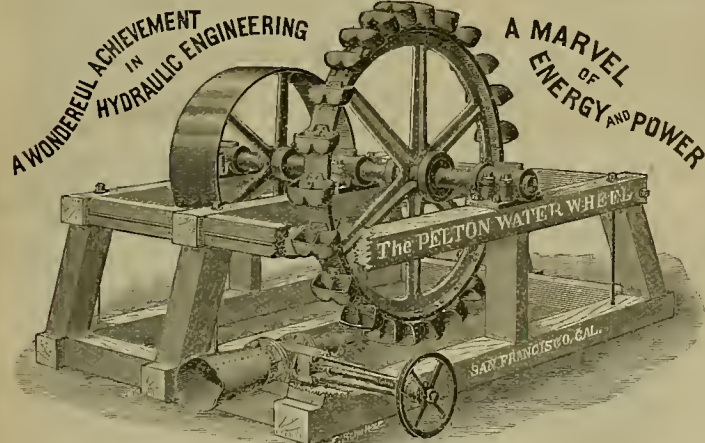
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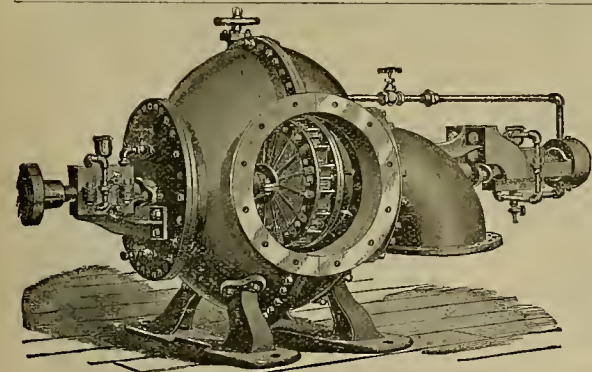
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BATTERY SCREENS.

Best and Cheapest in America.

No imitation, no deception, no pamished or rotten
iron used. Only genuine Russian iron in Quartz Screens.

Finished iron screens at nearly half my former rates.

I have a large supply of Battery Screens on hand
suitable for the Huntington and All Stamp Mills, which I
will sell at 20 per cent discount.



PERFORATED SHEET METAL

For Flour and Rice Mills, Grain Separators, Revolving
and Shot Screens, Stamp Batteries and all kinds of Min-
ing and Milling Machinery. Iron, Steel, Copper, Brass.
Zinc and other metals punched for all uses.

Inventor and Manufacturer of the celebrated Slot Cut
or burred and Slot Punched Screens.

Mining Screens a specialty, from No. 1 to 15 (fine).

Orders promptly attended to.

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221 & 223 First St., San Francisco, Cal.

JOHN W. QUICK, Proprietor.

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44 Third Street, - San Francisco, Cal.

This Fire-proof Brick Building is centrally located, in
the healthiest part of the city, only a half block from the
Grand and Palace Hotels, and close to all Steamboat and
Railroad Offices.

Laundry Free for the use of Families.

HOT AND COLD BATHS FREE.

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And Upward.

Rooms with or without Board.

Free Coach to the House

J. POOLEY.

MARKET REPORTS.

Local Markets.

SAN FRANCISCO, May 1, 1890.

General trade has held fairly active throughout the week. From the mining districts all advices are confirmatory of more prosperous times than have been enjoyed for several years past. Advices from the agricultural districts are also of an encouraging character. The only present drawback is the labor agitation and threatened strikes by several labor organizations. For all of five years past we have been singularly exempt from strikes, but now they appear to have come on with renewed energy. Iron manufacturers are quite confident of success, which will place them in position to compete for work that has gone East; at any rate, they will not lose money, as they had been doing.

The money market is fairly easy, with no urgent demand from any one quarter, while remittances are free. The wool clip moves off freely, which is putting considerable money afloat; while free selling of grain unites large sums of money. Sterling exchange is firm, as are exchanges on New York. The last steamer leaving for Hong Kong took out 157,156 Mexican dollars, \$7010 gold coin and \$50,000 silver bullion.

MEXICAN DOLLARS—The market continues strong at fluctuating prices in sympathy with silver bullion. The demand is slow. Quotations the past week ranged from 79½@80c, closing at about one-half cent lower.

SILVER—The market at the East and abroad advanced and held fairly strong the forepart of the week, but with the prospect of no speedy action by Congress looking to favorable legislation on the metal, the price set back. The firm stand of Senators Teller and Stewart in favor of free coinage, ably seconded by Hon. Francis G. Newlands, encourages the belief that with the aid of the Democrats far more favorable silver legislation will be secured. It is to be regretted that the Republicans are trying to make it a party measure, for the re-monetizing of silver should rise above party, owing to the many industries that will be largely benefited directly by it, while the others will be benefited indirectly. Our foreign exchanges point to an almost certainty that with silver re-monetized in this country, the nations of Europe will soon fall into line. Although silver is about 10 per cent higher than it was a few months ago, yet very little is offering for sale, which shows that the production is not increasing.

London cables came through to-day quoting silver unchanged, as did New York telegrams. In the latter city \$1.03 was bid to-day for silver certificates. In our market the mint paid \$1.05, which was reduced to \$1.03½, and to-day they bid \$1.02.

QUICKSILVER—Receipts the past week aggregated 75 flasks, and exports by sea 152 flasks to Guaymas. The market is very strong at higher prices, under a good demand and better prices abroad.

ANTIMONY—The market continues strong under light stocks and small obtainable supplies at the East.

BORAX—Receipts the past week aggregated 216 casks, and exports by sea 200 lbs. to Honolulu and 1160 lbs. to Guaymas. The market is firm at the recent advance.

LEAD—Exports the past week aggregated 7000 lbs. to Victoria. Owing to the new ruling of the Treasury regarding the importation of Mexican ores, the market at the East has been advanced. The demand East is reported to be more active.

LIME—Receipts the past week aggregated 6976 bbls., and the exports by sea 1230 bbls. to Honolulu and 400 bbls. to Kahului. The market is fairly active at full rates.

TIN—The market has a firmer tone, under a freer consumption and stronger prices abroad for block. The higher market for pig abroad and at the East is due to a lessened output by the mines.

COPPER—The market is very strong. At the East there has been a steady advance, due to favorable markets abroad. Cable advices from London up to April 23d report as follows: Copper warrants are becoming scarcer, as the French stock are still held firmly for £50. Other sellers have offered more freely at intervals, but there is little outside speculative demand. The India demand, which has lain dormant for a long while, is beginning to revive somewhat, and there is at present a fair business in that direction. Recent transactions in furnace material include a total of 2250 tons Anaconda argenteiferous matte on private terms and 195 tons Montana matte at 10s. to arrive.

IRON—The market is reported fairly firm. Manufacturers are reported to be using more, with the prospect of enlarging their requirements still more at an early day. Eastern advices report continued strong competition by Southern furnaces. The production of the South increased from 688,000 tons in 1887, to 1,244,000 in 1889, while the output of the North only increased about 28 per cent within the like time. A London cable under date of April 23d to the Iron Age, says: Hematites dropped to 53s. 7d. in the face of reports that another meeting of West Coast smelters has been held at which it was agreed to damp more furnaces, and despite the fact that shipments are large and stocks decreasing under the influence of the same and reduced make, confidence seems to be entirely absent as a matter of fact, and little interest is manifested except on the part of sellers operating on the "bear" side.

COAL—Imports the past week aggregated as follows: Departure Bay, 8600 tons; Seattle, 1217; Coos Bay, 1600; New York, 100. Total, 11,500 tons. The market for Australian for shipment is gradually easing off, owing to lower outward charters at Australasian ports, and advancing outward charters at this port. The list of ships on the way and loading at both Newcastle, N. S. W., and Sydney is increasing in numbers. The consumption here of steam coals is steadily increasing. House coals are slower but no lower. The consumptive demand is gradually decreasing. The market is fairly steady.

Eastern Metal Markets.

By Telegraph.

NEW YORK, May 1, 1890.—The following are the closing prices the past week:

	Silver in London	Silver in New York	Copper	Lead	Tin
Thursday	47	1 05	\$14 35	\$4 02½	\$20 10
Friday	48	1 05	14 50	4 05	20 15
Saturday	48	1 05	14 35	4 05	20 50
Monday	48	1 05	14 40	4 02½	20 50
Tuesday	47	1 05	14 50	4 07½	20 35
Wednesday	46 9-16	1 01½	14 50	4 10	20 25

NEW YORK, April 29.—Borax, moderately active; 9½@9¾c for California, refined. Quicksilver, 69@70c; London, firmer in all hands; a good spurt and activity. All styles of lake copper firm; 14½c bids rejected. Casting brands something stiffer. Arizona, 12½@12¾c for most any other than common. There is a revival of the trade in lead in the East and West. Prices higher here. Spot, \$4.07½@4.10.

San Francisco Metal Market.

WHOLESALE.

	THURSDAY, May 1, 1890.
ANTIMONY—None in market	—@—
BORAX—Refined, in carload lots	3½@—
Powdered " " "	8@—
Concentrated " " "	7½@—
All grades jobbing at an advance	—@—

COPPER—		
Bolt	23@	25
Sheeting	23@	25
Ingot, jobbing	17@	18
Fire Bar Sheets	23@	25
LEAD—Pig	4½@	—
Bar	5@	—
Sheet	7@	—
Pipe	6@	—
Shot, discount 10% on 500 bags	145@	—
Buck, ½ bag	165@	—
Chilled, do.	185@	—
TINPLATE—E. V. steel grade, 14x20, to arrive	—@	—
E. V. steel grade, 14x20, spot	—@	—
Charcoal, 14x20	6 75@	7 00
Do roofing, 14x20	6 00@	—
Do, do, 20x28	12 00@	—
Fig tin, spot, ½ lb.	—@	21½
COPR—Eng. top, spot, in blk.	13 50@	14 50
Do, do, to load	14 50@	15 50
QUICKSILVER—By the flask	51 00@	—
Flasks, new	—@	—
Flasks, old	35@	—
CHROME IRON ORES	10 100@	—
IRON—Bar, base	3@	3½
Norway	4½@	5½
STEEL—English, B.	16@	20
Cast iron tool	9@	9
Black Diamond tool	9@	9
Pick and Hammer	3@	10
Machinery	4@	5
Toe Calk	4½@	—

IRON—To Load.	
IRON—Glengarnock ton	35 00@
Eglington, ton	35 00@
American Soft, No. 1, ton	—@35 00
Oregon Fig, ton	—@35 00
Pine Sound, 35 00	—@35 00
Clay Lane White	—@2 00
Shotts, No. 1	35 00@35 00
Bar Iron (base price) ½ lb.	—@—
Langston, 35 00	—@30 00
Thorcliffe, 35 00	—@34 00
Garbarric, 35 00	—@34 00
Barrow, 35 00	—@34 00
Thomas, 35 00	—@34 00
Cargolite, 35 00	—@34 00

Lumber.

Pine, Fir and Spruce.

	WHOLESALE.	RETAIL.	JOBBING.
Rough Pine, merchantable, 40 ft.	\$20 00	\$17 00	21 00
41 to 50 ft.	21 00	18 00	22 00
51 to 60 ft.	23 00	20 00	24 00
61 to 70 ft.	27 00	24 00	28 00
1x4, fencing	22 00	19 00	20 00
1x4, "	21 00	18 00	19 00
1x3, 1x4 and 1x6, odd lengths	19 00	16 00	17 00
Second quality	17 00	15 00	16 00
Selected	24 00	22 00	23 00
Clear, except for flooring	21 00	20 00	21 00
Clear for flooring	20 00	19 00	20 00
Clear V. G. No. 1 flooring	6 00	5 00	6 00
Dressed Pine, flooring, No. 1, 1x4	32 00	29 00	30 00
No. 1, 1x4	34 00	30 00	31 00
1x3, 1x4 and 1x6, odd sizes	37 00	33 00	34 00
All sizes, No. 2	27 00	24 00	25 00
Stepping, No. 1	44 00	40 00	41 00
Stepping, No. 2	34 00	30 00	31 00
Ship timber and plank, rough	27 00	24 00	25 00
Selected, planed, ½ side, 4x6 40 ft.	29 00	26 00	27 00
" " " " " " " "	31 00	28 00	29 00
" " " " " " " "	33 00	30 00	31 00
" " " " " " " "	35 00	32 00	33 00
Deck plank, rough, average 35 ft.	35 00	32 00	33 00
Dressed, average 35 feet	40 00	36 00	37 00
Pickets, rough, B. M.	20 00	18 00	19 00
4x14, 4 ft long, B. M.	6 00	5 00	6 00

Coal.

	TO LOAD.	PER TON.	PER TON.
Australian	7 50@	7 75	Lehigh Lump, 16 50@17 00
Liverpool S. M.	8 50@	—	Cumberland blk 16 00@
Scotch Splint	8 50@	9 00	Egg, hard, 15 50@
Cardiff	9 00@	9 50	—
SPOT FROM YARD.			
Wellington	9 00	Seattle	7 00
Greta	8 50	Coos Bay	6 00
Westminster Brymbo	9 00	Cannel	12 00
Nanaimo	9 00	Egg, hard	13 00
Sydney	3 50	Cumberland, in sacks	15 00
Gilman	7 00	do, bulk	14 00

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, term of subscription, and give it their own patronage, and as far as practicable aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

A PROSPECTOR named George Ross was fatally wounded near Gallup, New Mexico, recently by a party of Zunis. Ross managed to drive them off with his revolver and got to Fort Wingate.

COAL has been found near Carisa, San Luis Obispo county.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS

ASSESSMENTS.

COMPANY.	LOCATION.	No. AM'T. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Acme M & Co.	California	10.	3. Mar 20.	May 15.	June 3.	33 California St.
Alabama M Co.	Nevada	1.	8. Mar 18.	Apr 22.	May 15.	302 Montgomery St.
Alpha Cons M Co.	Nevada	4.	25. Apr 5.	May 16.	June 5.	309 Montgomery St.
Andes M Co.	Nevada	36.	25. Apr 10.	May 14.	June 3.	309 Montgomery St.
Bailey M Co.	Nevada	1.	18. Mar 18.	Apr 22.	May 15.	302 Montgomery St.
Baldwin M Co.	Nevada	38.	50. Apr 23.	May 9.	June 24.	302 Montgomery St.
Confidence S M Co.	Nevada	15.	75. Mar 12.	Apr 16.	May 7.	414 California St.
Cons Imperial M Co.	Nevada	27.	5. Apr 17.	May 22.	June 11.	329 Pine St.
Del Monte M Co.	Nevada	3.	20. Apr 16.	May 25.	June 13.	310 Pine St.
East Best & Belcher M Co.	Nevada	1.	25. Feb 11.	Mar 14.	Mar 31.	331 Montgomery St.
Gold Hill M Co.	California	9.	25. Apr 17.	May 24.	June 10.	302 Montgomery St.
Gould & Curry M Co.	Nevada	64.	30. Apr 28.	June 3.	Jun 26.	309 Montgomery St.
Hale & Norcross M Co.	Nevada	95.	50. Apr 9.	May 14.	June 5.	309 Montgomery St.
Hartford M Co.	Nevada	7.	2. Apr 8.	May 15.	June 6.	303 California St.
Holmes M Co.	Nevada	11.	25. Mar 16.	Apr 17.	May 8.	309 Montgomery St.
Humboldt M Co.	Nevada	22.	8. Mar 18.	Apr 22.	May 13.	302 Montgomery St.
Indian Creek M Co.	California	1.	10. Mar 12.	Apr 14.	May 14.	419 California St.
Kentuck M Co.	Nevada	21.	30. Apr 29.	June 3.	Jun 24.	310 Pine St.
Mayflower Gravel M Co.	California	46.	50. Mar 8.	Apr 10.	May 1.	328 Montgomery St.
Morning Star Cons M Co.	Arizona	1.	2. Apr 30.	May 31.	Jun 21.	230 Montgomery St.
Navajo M Co.	Nevada	22.	50. Apr 8.	Apr 17.	May 13.	310 Pine St.
North Belle Isle M Co.	Nevada	17.	20. Apr 8.	May 14.	June 5.	310 Pine St.
North Commonwealth M Co.	Nevada	3.	25. Apr 16.	May 21.	June 25.	310 Pine St.
North Occidental M Co.	Nevada	2.	6. Mar 31.	May 5.	May 26.	302 Montgomery St.
Occidental Cons M Co.	Nevada	1.	25. Apr 22.	May 30.	Jun 30.	309 Montgomery St.
Opbir M Co.	Nevada	11.	25. Mar 12.	Apr 17.	May 13.	309 Montgomery St.
Peerless M Co.	Arizona	5.	10. Mar 28.	Apr 30.	June 9.	308 Montgomery St.
Potosi M Co.	Nevada	34.	50. Mar 27.	Apr 30.	May 21.	309 Montgomery St.
Quaker G M Co.	California	13.	20. Mar 8.	Apr 5.	May 5.	328 Montgomery St.
Scorpion M Co.	California	1.	Mar 10.	Apr 17.	May 13.	309 Montgomery St.
Standard Cons M Co.	California	2.	25. Mar 4.	Apr 14.	May 19.	310 Pine St.
Utah Cons M Co.	Nevada	9.	25. Mar 11.	Apr 17.	May 6.	309 Montgomery St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Church G M Co.	California	J. M. Buffington	303 California St.	Annual	May 5
Commonwealth Cons M Co.	Nevada	H. Deas	309 Montgomery St.	Annual	May 7
Cons Imperial M Co.	Nevada	C. L. McCoy	329 Pine St.	Annual	May 14
Diana G M Co.	California	J. W. Pen	330 Pine St.	Annual	May 15
Justice M Co.	Nevada	R. F. Kelly	310 California St.	Annual	May 5
Live Oak Drift M Co.	California	J. Morizio	328 Montgomery St.	Annual	May 15
Mayflower Gravel M Co.	California	J. Morizio	328 Montgomery St.	Annual	May 13
Morgan M Co.	California	L. Bresse	323 Montgomery St.	Annual	May 3
Scorpion M Co.	California	G. R. Spinsky	310 Pine St.	Annual	May 12
Volcanic Hydraulic M Co.	California	M. Casey	553 California St.	Annual	May 7

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Champion M Co.	California	J. Wetzel	522 Montgomery St.	10.	Jan 20
Candelaria Cons M Co.	Mexico	G. Gato	309 Montgomery St.	25.	Apr 5
Caledonia M Co.	Nevada	A. S. Chaudin	328 Montgomery St.	08.	Apr 1
Cons California & Va M Co.	Nevada	A. T. Havens	309 Montgomery St.	25.	Feb 10
Consolidated Cons M Co.	California	T. W. Pen	322 Montgomery St.	10.	Apr 24
Idaho M Co.	California	—	Grass Valley	2 50.	Mar 7
Min Diahlo M Co.	Nevada	R. Heath	319 Pine St.	30.	Oct 23
Pacific Borax Salt & Soda Co.	California	A. H. Clough	230 Montgomery St.	1 00.	May 10

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING APR. 10.	WEEK ENDING APR. 17.	WEEK ENDING APR. 24.	WEEK ENDING MAY 1.
Alpha.....	1 05	1 15	1 45	1 00
Alta.....	1 15	1 25	1 45	1 20
Andes.....	55	65	70	65
Belcher.....	2 00	2 40	2 15	2 40
Best & Belcher.....	2 35	3 00	2 55	3 40
Bodie Cons.....	1 00	1 25	1 15	1 30
Bodie Con.....	55	60	70	65
Bulwer.....	20	25		25
Commonwealth.....	2 60	2 85	2 55	3 40
Cons. Va. & Cal.....	1 45	1 55	1 35	1 60
Challenge.....	1 85	1 55	1 30	1 25
Chollar.....	8 55	5 00	5 25	5 00
Confidence.....	3 50	4 00	4 00	5 00
Cons. Imperial.....	55	40	55	45
Caledonia.....	2 05	2 65	2 50	2 75
Crown Point.....	2 05	2 65	2 50	2 75
Crocker.....	30	35	30	35
Del Monte.....	1 00	1 10	1 05	1 05
Eureka Cons.....	6 00	6 00	6 00	6 00
Eschschuer.....	60	65	60	65
Grand Prize.....	30	35	40	45
Gould & Curry.....	1 65	2 05	1 75	2 10
Hale & Norcross.....	2 60	3 10	2 50	2 65
Idaho.....	1 25	1 40	1 35	1 40
Justice.....	1 25	1 40	1 35	1 40
Kentuck.....	80	85	1 05	1 25
Lady Wash.....	30	35	30	35
Mono.....	25	35	40	45
Mexican.....	2 35	3 00	3 25	3 45
Navajo.....	1 5	15	25	35
North Belle Isle.....	1 10	1 00	1 00	1 15
Nev. Queen.....	1 15	1 50	60	65
Occidental.....	1 00	1 10	1 15	1 45
Opbir.....	1 00	5 12	5 30	4 35
Overman.....	3 00	1 45	1 75	1 30
Potosi.....	3 45	6 00	6 35	4 20
Peerless.....	20	20	25	20
Peer.....	15	25	25	25
San Jacinto.....	2 30	2 40	2 40	2 30
S. B. & M.....	1 35	1 50	1 35	1 40
Sierra Nevada.....	2 25	2 50	2 60	2 75
Silver Hill.....	35	35	15	25
Scorpion.....	25	25	35	25
Shoshone.....	2 35	2 60	2 80	2 75
Utah.....	60	75	1 20	1 30
Yellow Jacket.....	2 20	2 75	3 10	2 85

Assessment Notices.

GOLD HILL MINING COMPANY—Location of principal place of business, San Francisco, California; location of works, Grass Valley, Nevada County, California.

Notice is hereby given, that at a meeting of the Board of Directors held on the 17th day of April, 1890, an assessment (No. 9) of Twenty-five Cents per share was levied upon the capital stock of the Corporation, payable immediately, in United States Gold Coin, to the Secretary, at the office of the Company, Room 20, Phelan Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 24th day of May, 1890, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY the 10th day of June, 1890, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors

C. A. GROW, Secretary,
Office, Room 20, Phelan Building, San Francisco, California.

DIVIDEND NOTICE.

OFFICE OF THE PACIFIC BORAX, SALT and Soda Company, San Francisco, April 30, 1890. At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 31) of One Dollar (\$1.00) per share was declared, payable SATURDAY, May 10, 1890, at the office of the Company, No. 230 Montgomery Street, Rooms 11 and 12. Transfer Books close May 5, 1890, at 3 o'clock P. M.

ALTON H. CLOUGH, Secretary.

PRACTICAL

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Paul's Dry Amalgamating Barrel Process.

The undersigned is prepared to erect, or furnish drafts for erecting, machinery, also instructions for working ores by the now patented **DRY AMALGAMATING BARREL PROCESS**. I assert the ability to overcome EVERY difficulty connected with amalgamating the precious metals, more especially gold, and to add from 25 to 100 per cent to the **FREE GOLD** yield of any mill working **WET**. Being the original inventor of dry amalgamation, I have spent over 20 years perfecting the system, now brought to a wonderfully efficient, inexpensive and practical one. I caution all parties against infringements. For further particulars, address

ALMARIN B. PAUL,
Middle Creek P. O., Shasta County, California.

THE AMERICAN BARREL PROCESS.

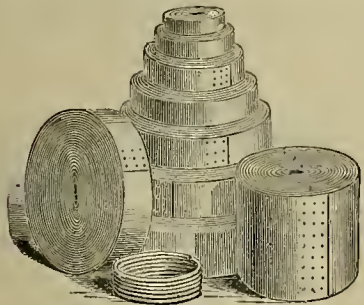
I hereby certify that I made, at the Calaveras mine, a comparative test, as between stamps and silver plates working **WET** and the Paul Barrel Process working **DRY**. The quantity of ore worked was 72 tons, all carefully divided and weighed for each test. The result from 36 tons worked by stamps **WET** was \$24.05 per ton. The result from the 36 tons worked by the Paul process **DRY** was \$92.00, making a difference of \$67.95 per ton in favor of the Paul Process. The test was as exact as it was possible to make it.

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FOR SALE CHEAP.

One new double circular Sawmill to carry 60-inch bottom saw, with wrought-iron hangers for top saw. Friction feed-works, patent steel screw double-throw head-blocks, with track iron, saw carriage and frame complete.

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(Successors to THOMSON & EVANS),

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and all kinds of MACHINERY.



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Machinery of all Kinds.

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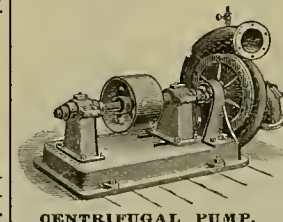
Patent Water Tube Steam Boilers.

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Centrifugal Roller Steel Mills,

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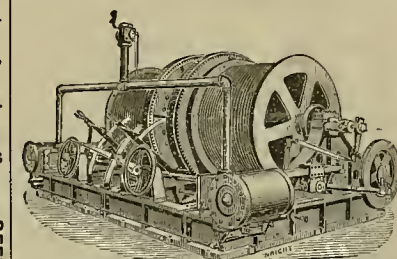
34 and 36 West Monroe St., Chicago.

197 to 203 Congress St., Boston.

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PARKE & LACY CO., San Francisco.

Send for Catalogue.



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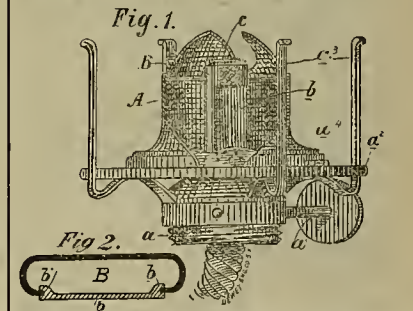
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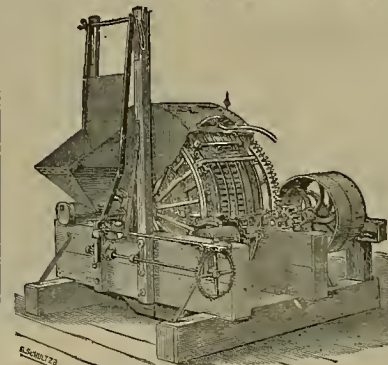
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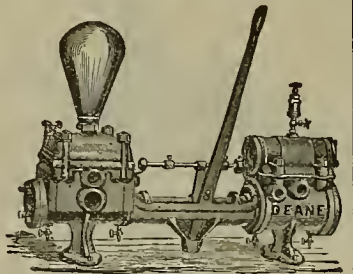
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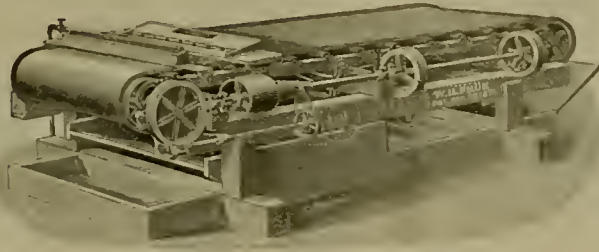
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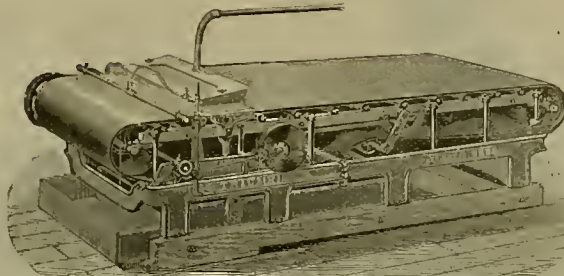
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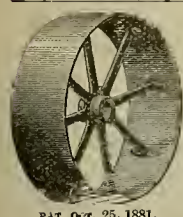
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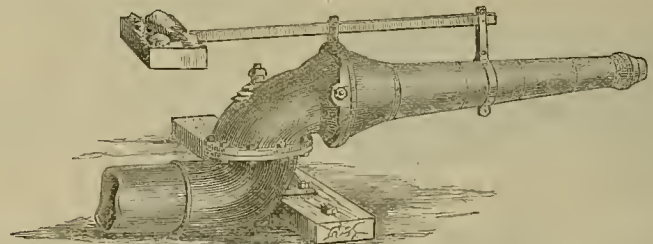
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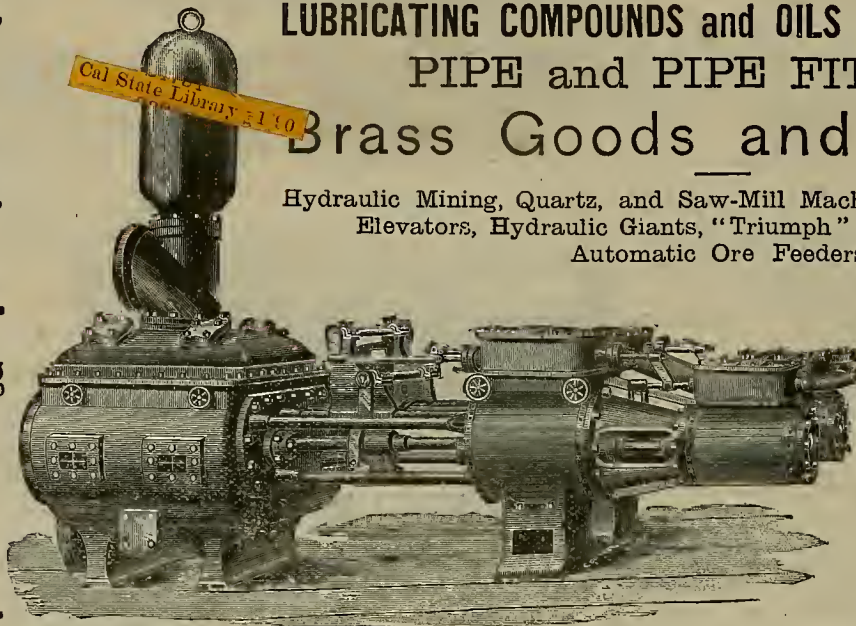
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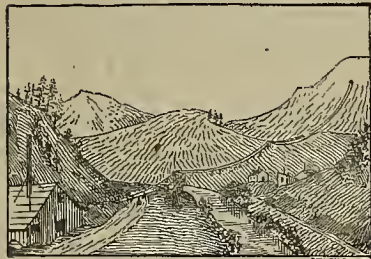
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The Pittsburgh Boiler Scale Resolvent.

This Resolvent IS NOT AN EXPERIMENT but a FACT, and it will do the work
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INJURE THE IRON.

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We use the Pittsburgh "Boiler Scale Resolvent," and are well satisfied with the results obtained. We have
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No water in the United States produces scale in greater quantity or of a harder nature than
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are large steam users IN PITTSBURGH, and using the water from said river as boiler-feed for
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made: Carnegie Brothers & Co., Proprietors of the Edgar Thomson Steel Works; Dilworth,
Porter & Co.'s Spike Works; and Oliver and Robert's Wire Co.; and many other firms in the
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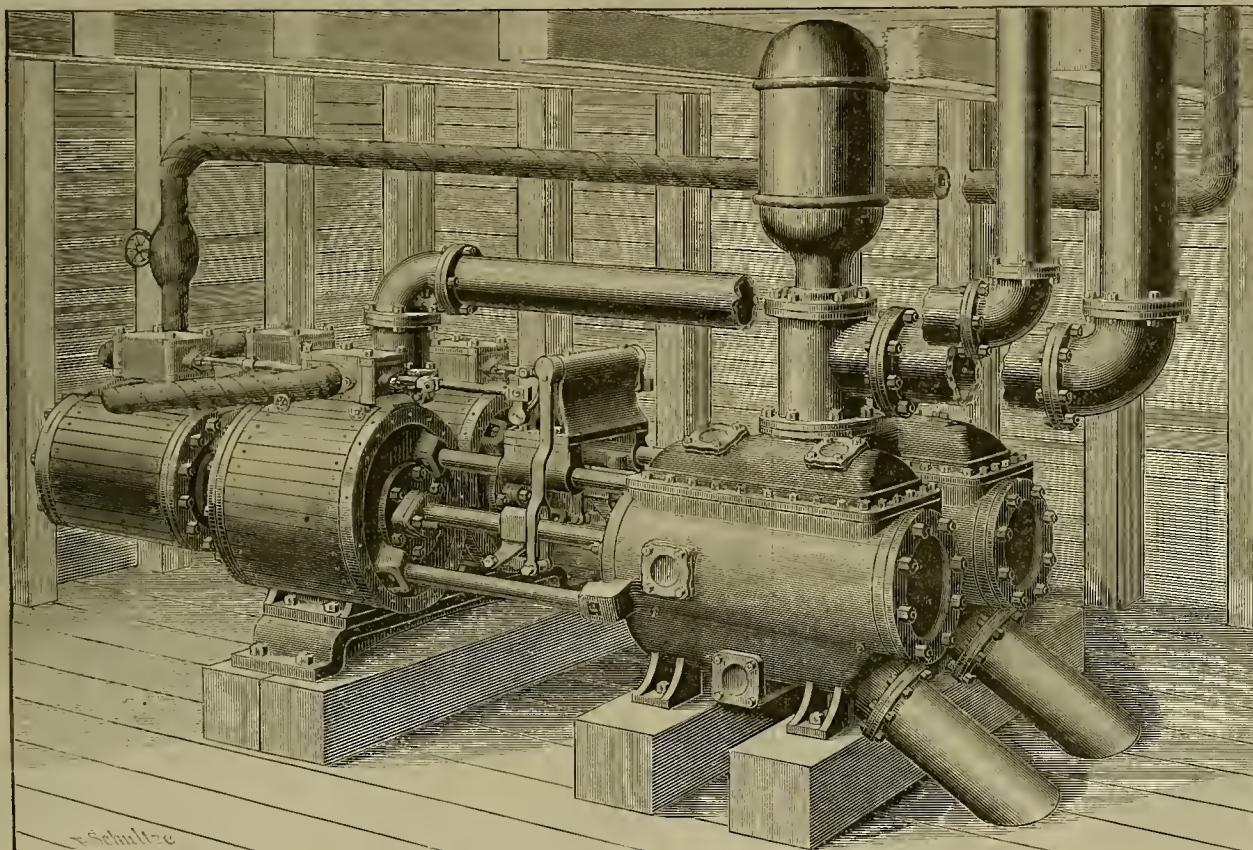
MINING AND SCIENTIFIC PRESS.

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SAN FRANCISCO, SATURDAY, MAY 10, 1890.

Three Dollars per Annum.
Single Copies, 10 Cts.



THE WORTHINGTON COMPOUND STEAM PUMP.

The Worthington Pump.

The Worthington compound steam pump is made in various sizes and patterns according to use to which they are to be applied. The compound cylinder is recommended for any service where the saving of fuel is an important consideration. The compound cylinders are extensively applied to hydraulic elevator pumps, tank, fire, pressure and mine pumps, and to engines designed for the water supply of small cities and towns. In the past six months, the agent, Mr. A. L. Fish, has supplied a number of large plants on this coast. In San Francisco, he has put in the pumping plant for the new Chronicle building, the Palace hotel, and the New California theater. The Hotel Vendome at San Jose and the Hotel San Rafael have also been supplied with these pumps. A large plant has been put in at Seattle, with a capacity of 3,000,000 gallons; one at Tacoma, 3,000,000 gallons; at Olympia, 2,000,000; at Alhio, O., 1,500,000; Woodland, Yolo county, 1,000,000; Vallejo, Solano county, 1,000,000; and Mazatlan, Mexico, 4,000,000 gallons. These are only a few of the contracts made since November last. This pump is distinguished for great simplicity and strength of construction, having few moving parts with no harsh motions. The parts are easily accessible for repairs.

Sutter's Fort.

Sutter's Fort, in Sacramento, is one of the few historical buildings in California. It is still standing and is to be restored. Before the discovery of gold it was a most important station in the upper part of California, for it was there that General Sutter and what few white men were here had their headquarters. It was at this place, too, that James W. Marshall, the discoverer of gold in California, whose statue was unveiled last week, first went to work for General Sutter. He was sent by Sutter to the mill at Coloma, and found the nugget which caused the gold excitement of 1848-49. This nugget he took to Sutter at Sutter's Fort, and after a few tests the discovery was made public.

The sketch on this page shows the appearance of the Fort in 1849 at the time of the influx of gold-hunters to this State. Lately, steps have been taken by the Native Sons of the Golden West to preserve what is left of the buildings for the benefit of the public, and the grounds are to be set aside as a park.

At Corrick's mine, near Temperance Flats, Fresno Co., J. M. Corrick was shot and killed by his son-in-law, Henry Sullivan. The parties to the tragedy had been at law about the ownership of a mine, and after the case had dragged through the courts for several months, it was decreed that Corrick was the owner of the property. Corrick went up to the mine about two weeks ago, and was at work when shot.

The Virginia City papers announce that the owners of the California battery and stamp-mills have concluded to dismantle them this year on the score of economy, as it has been demonstrated that the cost of operating them, either by the wire-rope system or steam power, is greater than that of operating the Carson river mills.

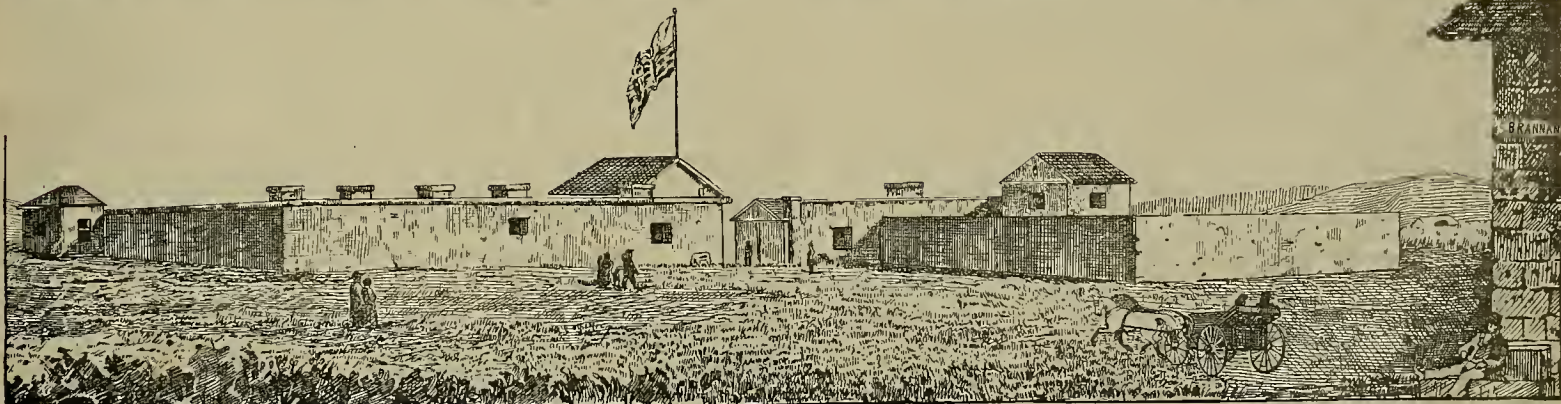
Mazatlan, Mexico, is now supplied with water through steel pipes from a source 20 miles distant. D. Ernest Melliss of this city is the constructing engineer of the works.

The amount paid out for wages alone last month by the Comstock mining companies was \$234,495. The highest hill was that of Con. California and Virginia—\$53,885.

At Livermore, Alameda Co., work was commenced this week on three drifts from the main tunnel in two veins in John Treedwell's Enreka coal mine, and the force has been increased to 60 men. The main tunnel is now in 1500 feet, which is about half-way to the summit vein.

SIDNEY M. SMITH has been elected vice-president of the Regan Vapor Engine Co. of 221 First St., this city, and has not displaced Francois Cutting as president as stated in the Press last week.

The Comstock yielded the first quarter of this year \$1,245,516. Ore shipments were entirely suspended for some weeks during the snow blockade.



SKETCH OF SUTTER'S FORT IN 1849.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—*Eds.*

The Foundry at Sonora.

EDITORS PRESS:—It may be news to some of your readers who are interested in mining, who reside in the city, to know that in our mountain town we have a foundry in full operation and most successfully administered, which is of paramount advantage to all persons actively engaged in developing our quartz lodes. Here, any kind of machinery, from a coffee-mill to a quartz mill, can be made at San Francisco prices, and the castings I have this day examined show a smoothness and finish comparably as perfect as any city work. Further, the owners guarantee to give satisfaction. The proprietors of the foundry are Messrs. Romans & Patterson. The first gentleman is an expert pattern-maker and designer, as well as business manager. He is an old resident of Sonora, and is well and favorably known for his upright conduct in business. The other partner, Mr. Patterson, is a first-class mechanical engineer, and came from Virginia City, buying into the foundry quite recently. He was chief engineer in the Combination shaft on the Comstock and Alta Company, and further acted in the same capacity at the New Almaden mines (quicksilver). Again, he superintended the laying of the water-pipes from Oakland to San Francisco. The foundry is fortunate in securing the services of such a thoroughly capable man, and one so skilled at the lathe.

I will now briefly describe the shop and its surroundings. There are three lathes, 10, 12 and 30 inches, planing machines, drills, boring-mills, two blast smelting furnaces, capacity 5 and 1½ tons respectively; two brass furnaces, with all the necessary equipments for a first-class foundry—all driven by a 30-foot over-shot water-wheel. There is a spacious molding floor 30x60 replete with all the modern improvements, and a natural deposit of very valuable plumbago and near at hand that is made available for molding. There is a pattern room and a fireproof pattern-house literally full of patterns of all kinds and descriptions. This foundry has become noted for its very superior shoes and dies, being composed of a certain mixture of steel, white iron and wrought, the exact proportions being a secret of their own; suffice to say, they are thoroughly toughened, wear evenly, are not brittle, and actually last longer than the Pittsburgh steel shoes—in fact they are pronounced far superior by those that have used both. It is only by long and continued practice and experience that they have arrived at such perfection. It is well for us here that our cash can be kept in the county instead of sending it East or even to your city, for the raw material you must provide us with at any rate, so live and let live. I noticed they have just completed a seven-foot double-grooved sheave for the Golden Gate mine here and are finishing a five-stamp mill for Angels Camp, Calaveras county. This foundry's gold mortars are a specialty, being cast with the minimum amount of iron, and from long use by gold-mill men they prefer them, being incontestably more convenient and suitable for gold rock than the ordinary huge patterns, which are really silver mortars. These mortars are constructed to receive wooden housings, which have the advantage over the latter in cleaning up or in changing and replacing the worn shoes and dies, and for inside amalgamation they are perfect.

Sonora, Tuolumne Co.

Road Work in Mendocino County.

EDITORS PRESS:—In a communication to the PRESS a few weeks ago I dwelt somewhat on methods of road work now in vogue, and on the advantages of the contract system. Since that time the Board of Supervisors of Mendocino county have been in session, and in passing on a number of petitions from road districts in which the petitioners pray that the roads in their respective road districts be let by contract, laid down the principle that, in their opinion, the wishes of a majority of property-owners in any road district should determine whether said district should be worked by contract or by the old system. This is, I believe, as it should be, and will pave the way for a fair trial of road working by contract, in Mendocino county. Considerable care will be needed in drawing up the form of contract so as to protect the public and at the same time give the contractor a fair show.

There would be no injustice at the beginning if the contract prices were fully up to the average cost of road work for two or three years past in the road district let, as a contractor would have unusually difficult work for the first year of his contract. It is to be hoped that the contract system will be given a fair trial in most of our counties this year. The present system seems a hopeless one.

Passing this question, there is another which deserves more than passing attention, and that is the manner of survey made for a new road. In no branch of county business is there more false economy shown than right here. Everything in building a new road depends on its being laid out on the best and easiest line, and in the survey itself being an exact and scientific

operation. Every unnecessary rise or fall is a tax on travelers as long as the road exists. Travel where you will, through the hilly or mountainous sections of California, and you will see roads which show bad work, paralleled by abandoned roads on still worse lines. It by no means follows that because a road is easy it need cost one cent more to build. To properly survey a road requires two kinds of knowledge. The first is a knowledge of the lay of the country through which it is to be built. This the resident usually has. The second is the actual skill of a surveyor and road engineer, a man who, possessing tools for careful work, has also the knowledge of practical engineering to make the most of the nature of the ground over which a road is to be built.

Now the first sort of knowledge is plentiful enough, but practical road engineers are neither plenty nor very cheap. Yet when we compare the cost of employing the best of road engineers with that of building roads which are a perpetual and unnecessary inconvenience to the public, and which more than likely will at some later date have to be abandoned for an easier grade or more direct route, the former sinks into insignificance. It would pay the supervisors in any county to employ as surveyor for a new road the best civil engineer that they could secure even at a cost five times as great as for surveyors who have no particular knowledge of the science of road engineering. Associate with such an engineer men who have a thorough acquaintance with the country to be traversed, and there would be a reasonable probability that the road so surveyed would be permanent, and would not cost in changes more than the original cost.

Throughout California the traveler is impressed by the vast amount of money wasted on roads now abandoned. In one instance I know of three grades paralleling one another within 200 yards, and that, too, on an open hillside on which a half-mile grade was to be made. Roads could have been made and macadamized for a less amount than has been squandered in such instances. Nor is this ancient history. The mistake is being constantly repeated. A new road is to be laid out at a cost of \$5000. Let us see how it is done.

The Board of Supervisors appoint three men as viewers—one a young man who has a smattering of surveying and who, with the compass, which is his only tool, can run a line or find a section corner, and on that bases his title to the name of surveyor; the other two, farmers or stockmen to whom we can allow even an annual amount of sense in the line of their business without acknowledging any qualifications as road-builders. These three men, with scarcely any instruments, survey a road, it is accepted and \$5000 expended. Is this business? Is the building or planning of a good road over such difficult country as is the rule in much of California, such a simple matter that a surveyor possessing the knowledge for doing only the simplest of work in land surveying, and two other men who, however shrewd generally, are not even by courtesy road-builders, can do it well? We think not; and yet I have, if anything, stated the case too kindly to be a truthful account of how such work is done, not particularly in Mendocino county, but all over California.

CARL PURDY.

Ukiah.

Gold and Silver Product.

Mint Director Leach has submitted to Congress a report on the production of precious metals for the year 1889. The gold product of the United States was 1,587,000 fine ounces, of the value of \$32,800,000, as against \$33,000,000 the preceding year. Of the gold product \$31,959,047 was deposited at the mints for coinage and manufacture into bars. The silver product was approximately 50,000,000 fine ounces, of the commercial value of \$46,750,000, and the coinage value of \$64,646,464, against an estimated product for 1888 of 45,733,632 fine ounces, of the commercial value of \$43,020,000, and the coinage value of \$59,195,000. The increase over 1888 was about 4,216,368 fine ounces, of the commercial value of \$3,730,000.

In addition to the silver product of our mines, about 7,000,000 ounces of silver was extracted from lead ores imported into the United States and smelted in this country, and over 5,000,000 ounces from base silver bars imported, principally from Mexico, making the total product of our mines, smelters and refineries about 62,000,000 fine ounces of silver.

Of this amount the Government purchased for coinage 27,125,357 ounces; there were used in the arts about 6,000,000 ounces, and there was exported to Hongkong, Japan and the East Indies about 9,000,000 ounces. We shipped to London for sale about 20,000,000 ounces.

Colorado still maintains the first rank among the producing States, with an aggregate product of gold and silver of over \$24,000,000. Montana stands next, with a product of \$22,894,000. California produced \$14,034,000, of which \$13,000,000 was gold, being about two-fifths of the total gold product of the United States. Utah shows a largely increased product, notably in silver. Idaho and New Mexico report an increased product, and Arizona and Nevada reduced products for 1889. The gold product of South Dakota increased from \$2,600,000 in 1888 to \$2,900,000 in 1889.

Oregon and Washington both report increased products, the former having produced \$1,200,000 in gold. The States of the Appalachian range show a slightly increased product of gold over 1888.

The total value of the gold deposited during the calendar year was \$48,903,072, of which \$42,599,206 was new deposits and \$6,303,866 redeposits. The total deposits and purchases of silver aggregated 36,297,584 standard ounces, of the coinage value of \$42,237,165, of which 36,074,212 standard ounces, of the coinage value of \$41,977,265, was in new deposits. The quantity of silver purchased for silver-dollar coinage was 27,125,357 fine ounces, costing \$25,379,510, or an average cost of 93 56 cents per fine ounce. The amount of silver offered the Treasury Department for sale aggregated 47,965,700 fine ounces.

The net loss of gold and silver to the United States by excess of exports over imports was as follows: Gold, \$38,886,753; silver, \$14,788,666; total, \$53,675,419.

The amount of gold and silver used in the industrial arts during the calendar year 1889 in the United States was: Gold, \$16,697,000; silver (coinage value), \$3,766,000; total, \$20,463,000. The amount of domestic bullion used in the arts was: Gold, \$9,686,827; silver (coinage value), \$7,297,933; total, \$16,984,760.

The total metallic stock of the United States is estimated to have been on Jan. 1, 1890, as follows: Gold coin and bullion, \$689,275,007; silver coin and bullion, \$438,388,624; total, \$1,127,663,631.

An Important Measure in Forestry Reform.

Hon. Thos. J. Clunie, in response to public sentiment and the magnitude of the irrigation, mining and lumbering interests of this State, prepared, and on March 20th introduced, H. R. bill 8459, providing for the proper and systematic administration of the public timber lands of the United States lying west of the 97th meridian of longitude. Briefly, Mr. Clunie's bill provides first, for the temporary withdrawal of all timber lands; second, its classification into three groups, to wit:

Section 1—Lands distinctively forest and of more value for the commercial worth of the timber thereon than for other purposes.

Section 2—Lands more or less timbered, but of greater agricultural than forest value.

Section 3—Forest lands of direct use in preserving existing hydrologic conditions, watersheds, etc.

Provision is made for the return of lands of second section to the Department of the Interior as subject to sale or occupation under existing laws. All others are declared to be forever the inalienable forest reserves of the United States.

Provision is made for a forest commissioner and four assistants, who shall be "proper persons, versed in matters pertaining to forestry," and who shall be required to give practical oversight to and direct the care of the forest districts to which they may be assigned.

To encourage and stimulate our great lumber industries, provision is made for the sale of timber (by stumpage) upon lands of the first and third classification, subject only to such reasonable restrictions against waste and despoliation as the commission may impose. Fines and punishments are provided for licensed timber or fuel cutters who violate the regulations of the commission; and likewise against depredators and trespassers upon these reserves.

In view of the heavy revenue that will pass through the hands of the commission, commensurate bonds are properly exacted of them; also an annual report to Congress. One of the strongest features of the bill is one providing that this commission shall be within the Department of Agriculture, an assurance itself to irrigators and farmers that their interests will be closely watched.

Mr. Clunie, while closely following the general recommendations of the California State Board of Forestry in its recent memorial to Congress, has elaborated the details of a most comprehensive and admirable forestry bill, not alone creditable to himself, but calculated to serve all the interests involved—antagonize none. Amid the mass of legislation now before Congress bearing upon the reclamation and irrigation of waste and arid lands, none is more germane to the matter than this bill, nor more practical and statesmanlike in its application.

Patriotic pride in California, her magnificent forests, stupendous irrigating systems and her resources, should lead us to unite with Mr. Clunie in desiring to place the State on record as a pioneer in this direction, and it is to be hoped that he will have the unqualified indorsement of both press and the public, with all the influence they can bring to bear upon the Committee on Arid Lands, tending to the adoption of this bill.

This measure has been submitted to a sub-committee of the House, composed of Lewis F. Watson, chairman, Pennsylvania; Erastine D. Turner, Kansas; Jos. M. Carey, Wyoming; John Quinn, New York.

Friends of forestry, and those coinciding in thinking that our State should receive due attention upon this matter, are invited to communicate with this committee, urging upon them consideration of the merits of Mr. Clunie's bill, and advocating its passage.

The Deep Gold Placers of California.

NUMBER VI.

Written for the PRESS and Copyrighted 1890, by HENRY G. HANKS, F. G. S. A., F. G. S. J.

Physical Condition of the Gold.

I have in my collection two remarkable specimens, silent witnesses of forces so long employed in the production of the deep placers of California. Both were found on the bedrocks under the gravels. One is an amber-colored chalcedonic pebble showing indisputable marks of attrition. It has been broken and the hollow interior exposed; into the cavity small pebbles of dark-colored quartz have been forced by an unknown power; these cannot now be removed without breaking the chalcedony. The edges of the chalcedony have since been rounded, showing that the action was not recent.

The other is an elongated pebble of argillaceous slate, honeycombed with thin seams of a fibrous undetermined mineral. In several small cavities little rounded grains of gold have been placed, presumably by the same force that put the quartz in the hollow chalcedonic pebble. This gold is not in any way attached to the pebble except by pressure; the grains are of usual and well-known placer gold, and have to all appearance been placed in the cavities mechanically. Any doubt as to their being true placer gold is removed by examination under the microscope, when they are seen to be coated or rusty.

The quantity of fine gold in mispickel and pyrites in the veins and the bedrock of the deep placer region, is vastly greater than in the quartz in a free state. This is mostly lost to man after it is set free by natural causes, for the reason mentioned before; it is so finely divided that it escapes all known processes invented for its capture.

It is not uncommon to find by assay 20 ounces of fine gold to the ton of pyrites; while these minerals without gold are almost unknown in California. When we consider that practically all the iron so abundant in the deep placers is derived from pyrites, we may realize what an enormous quantity of the precious metal has gone to waste by this wide gateway.

When the gold is set free, being in a condition to float, it is lifted by the turbid waters of mountain torrents, borne away and scattered far and wide.

It is a fact well known to miners that the proportion of gold, bulk for bulk, is greater in narrow than in wide mineral veins. Some veins, so thin that they are called "knife-blade veins," are worked with profit by a system known as "oreveiling." A notable example of this style of mining may be studied in El Dorado county, where such veins contain the rare mineral rosacelite, never more than an inch in thickness and generally far less, and all the gold is concentrated in it.

Gold in the Eiman mine, Plumas county, is ragged, and while generally finely divided, is evidently comparatively recently released from the matrix. As an additional evidence of this, when examined microscopically, quartz is found attached to the gold. At Soap Point, also in Plumas county, and near the Eiman, nuggets of unusual size are the rule, and they are all hattered and flattened. Gold in rivers near the sea, and in the ocean beach sands, is bright and lustrous and entirely free from coating; it all amalgamates without the least difficulty.

Gold in Glacial Channels Elsewhere.

Australia.—At Ballarat, Victoria; gold was found from 100 to 175 feet deep. In the shafts sunk, water was struck at 70 feet that boiled up like an artesian well, in one instance giving the miners scarcely time to escape. In the Back Creek diggings, gold was found on a bedrock of pipeclay ("Gold Mining in Australia," John Manning, *Overland Monthly*, Vol. III, 1869).

The deep diggings in Bendigo are thus described ("Australia, Victoria. The Colony and its Gold Mines," William Westgarth, Edinburgh, 1853): "The gold is found in pipeclay, which is of a dazzling whiteness. This lying at a considerable depth, is made accessible by sinking vertical shafts. The auriferous matter is white quartz grit. Tunnels are sometimes driven which require to be well timbered; the auriferous grit is a distinct bed from one to two inches in thickness; above this stratum is a thick bed of howlers and gravel, all of pure white quartz, and all of them apparently derived from the same original quartz mass. There was also an ochre colored clay."

In October, 1851, at Ballarat, a blue clay was discovered from which the miners picked out small gold nuggets with penknives. At these localities, the gold grit lay on pipeclay. The true bedrock was never reached, and it was a constant theme of conversation with the miners what might be below this pipeclay. Water was so abundant that it was impossible to sink lower. An instance is related of a miner who sank and perished in the quicksands at the bottom of one of these shafts.

Channels in Australia are called "gutters." Mr. J. B. Lloyd of this city, who mined for some time in that country, informed me that at Ballarat in the Doctor's claim, much gold was taken out from a deep channel ("gutter") which was otherwise filled with gravel and pipeclay.

Switzerland.—Coxe thus alludes to the occurrence of gold in the beds of the Swiss glacial

rivars: "These mountains certainly should also in rich mines of gold and other metals, a remarkable quantity of gold-dust being found in the bed of the Ar and in the various torrents. I can conceive of nothing more fatal to the interests of Switzerland nor more repugnant to the liberties of the people than to have those gold or silver mines traced and opened. A sudden overflow of riches would effectually change and corrupt their manners. It is an incontestable truth that the real power of a country not ambitious of conquest is derived less from the wealth than from the industries of its subjects."

British Columbia.—It has recently been discovered that the boulder olivines of the Stikine river contain gold in quantities that would make its collection by the hydraulic process one of profit.

Ohio.—Channels similar to those of California are found in Ohio. Gold, too, is not absent. (Geological Reports of the State of Ohio, Vol. I, folio 462): "In concluding this subject it may be remarked that the rocky floor of the country is exceedingly irregular, full of abrupt declivities and deep gorges that are either wholly or partly concealed in the drift deposits."

(Geological Survey of Ohio, 1874, folio 70): "In 1868, seventeen dollars worth of gold was taken from Bowling Green township, a mile north of Brownsville, from glacial drift; the largest pieces were the size of grains of wheat. In Licking county, Prof. Andrews reports the quantity of gold is small, but in my experiments nearly every panful showed the color. There is a range of terraces about 50 feet above the bed of Licking river. These terraces are cut through by small streams from the south, and in the narrow ravines gold is obtained from the sands and clay. A jeweler in Newark found gold in small fragments of quartz." Prof. Orton writes, folio 71: "A few years since, the Clermont gold mines attracted a short-lived notoriety. * * * Clermont county has no monopoly of the gold-bearing formation of Ohio. * * * This formation should be called the drift gold-field rather than the Clermont county gold-field. * * * Without doubt one locality is as good as another where gravels have been washed from the boulder clay."

Renewed attention has lately been drawn to this locality and subject. The following is cut from a recent newspaper:

"Gold in Ohio.—A special from Cincinnati says: For several years gold in small quantities has been found in Clermont county in this State, not more than 20 miles from Cincinnati. Inexperienced men have worked over the ground at intervals. About a week ago two experienced miners who had received specimens of the ore from the farm of John Wood in Clermont county, looked over the ground thoroughly, and went to work. They say a discovery like that they have made anywhere in the regions of the West, would attract 2000 miners in 48 hours. Until the arrival of these miners, no attempts were made to tunnel into the hill where the gold was found. So confident are the miners that they have struck a rich lead that they have perfected plans to sink a shaft and at once begin tunneling to the spot whence the surface gold comes."

Indiana—Gold in the Glacial Drift in Indiana (First Annual Report of the State Geologist, 1869, folio 190): "Gold has been found in Franklin county in Sein creek. A common pallid of gravel and sand yielded two to three particles of gold in thin scales never larger than a grain of wheat. The yellow clay is mixed with quartz and chert and associated with black sand. The whole of Greene county is covered with glacial drift."

(Sixth Annual Report, 1875, E. T. Cox, State Geologist, folio 107): "Gold is found in the beds of creeks that flow into Beanblossom. The gold is 24 carats; this fineness is owing to the beating and squeezing to which it was subjected under the ice. * * * The total yield, according to one authority, was \$2900, and by another, \$10,000. The largest nugget found was worth \$1.10."

(Seventh Annual Report, 1876, E. T. Cox, State Geologist, folio 178): "Gold is found in the bed of Muscatatuck with black sand washed down from the glacial drift of the uplands. A small per cent of gold is mingled with the drift throughout the State. In Northampton county, the drift covers the entire area, from 100 to 150 feet thick."

(Eighth, Ninth and Tenth Annual Reports, 1879, E. T. Cox) refer to a great glacier which terminated at the Ohio river. In describing an experimental washing, Prof. Cox thus wrote: "But if hydraulic mining could be resorted to, it is possible that considerable gold might be washed out."

A paper on glacial deposits in Boone county, Kentucky, is quoted in full: "Several diamonds have been found; one weighed four carats. In Morgan county, as early as 1837, D. D. Owens studied the gold mines of Beanblossom creek and reported on them."

(Thirteenth Annual Report, 1883, John Collett, State Geologist, folio 81): "In 1850, some returned Californians observed some black sand magnetite in ravines in Brown and Morgan counties, which they prospectored for gold. Skillful panners could obtain from \$2 to \$3 per day for several weeks. The gold was in thin scales or almost invisible grains; it paid from 50 cents to \$1 per day. The gold was in glacial drift." According to the same author, this drift covers thousands of square miles from 10 to 500 feet in depth. He describes a glacial

formation much like those in California, in which are imbedded boulders of great size.

Channel Filling—Minerals.

Graphite (carbon) is found in some localities with placer gold. The only important locality known is Tusculum county near Sonora, where it has been mined to a limited extent.

Gypsum (sulphate of lime and water).—While this mineral is abundant in the State, it is rare in the placer mines. It is of too fragile a nature to resist the forces that crush harder minerals.

Ilmenite (titaniferous iron) is frequently a portion of the concentrates both of the drift and hydraulic mines, more so in southern counties than in the north.

Iridium, platinum and platinumidum, generally associated, occur in considerable quantities in numerous localities in California. They would probably not have been known had there been no gold mining. The miners often call these metals "white gold" and can with difficulty be made to believe them otherwise. Platinum is more abundant in the northern mines than in those more southerly, yet Butte county, a central one, is a noted locality. It is quite abundant at Cherokee and at St. Clair Flat near Penore, and is found with gold in the beach sands at Lompoc, Santa Barbara county.

Lead.—Metallic lead is frequently and even generally found in cleaning up hydraulic mines in California, but it all comes from shot and bullets which have fallen on the surface of the ground and been washed down into the claims.

Lignite (semi-coal).—Trunks of trees changed to lignite are frequently piped out of the banks in hydraulic mining.

Limonite (hydrrous sesquioxide of iron).—This mineral in a variety of forms is quite abundant both in the drift and hydraulic mines, so much so that at some localities the accumulations of yellow ochre have been extensively mined, and the product sold as a pigment. The quality is very fine, some varieties being equal to the best Roman ochre. Most of the color of the slickens is due to the presence of this mineral. The Georgia "brickbat" is largely composed of limonite, which is true of a similar deposit common in the deep placers of Plumas and Sierra counties.

Magnetite (magnetic iron ore).—This mineral is also abundant at the same localities, and in all placer mines in the State in the form of black sand, and in rolled masses and large boulders in the hydraulic mines. It is almost impossible to pan out a prospect of dirt in any of the placer districts of the State without finding some of the so-called black sand, even when no gold is found in the pan.

Orthoclase (soda feldspar) occurs not in abundance and seldom free, in the hydraulic mines; it is generally one of the constituents of rocks, most frequently pegmatite. It is rather common in San Diego county, and has been observed in Blackhawk canyon, San Bernardino county. I know of no instance of its occurrence in the deep drift mines.

Pyrite (bisulphide of iron).—This mineral is very abundant in the bedrocks underlying the deep placers and in quartz veins. It has contributed a large part if not all the iron in the limonites and other ferruginous channel minerals. It is sometimes found free, but not in very large proportion. It occurs in crystals in the carbonized woods and becomes a part of the cementing mineral which in some localities changes the loose gravels into conglomerates. Its mineralogical character is such that it cannot remain long without change, nor could it resist the conditions which existed in the glacial channels during the ice period. Crystals of limonite after pyrite frequently occur in the bedrocks near the surface, which being broken, show a central portion of the original mineral. These crystals are generally rich in gold, which can be very plainly seen on the fractured surfaces when examined under a microscope objective of moderate power. Some of these crystals are very interesting. Crystals of pyrite are sometimes found on which little bosses of gold have been deposited without any regularity. These are wholly superficial and evidently more recent than the crystals.

Pyrolusite (binoxide of manganese).—This is a rare mineral in the gold channels. The only instance coming under my observation was in the hydraulic mine at Sweetland, Nevada county. Argentine and Momford Hill in Plumas county are reputed localities.

Serpentine (hydrrous silicate of magnesia).—While serpentine rocks are common and abundant in the gold regions of the State, they are so soft that they soon wear away; when broken, masses assume the form of temporary boulders. For this reason they are rare in the uncovered channels and wholly absent from the deep placers.

Stream Tin (cassiterite, oxide of tin).—While it has been announced that this mineral has been found in the gold placers of California, I know of no instance of its occurrence.

Water is very abundant in all the deep placers of the middle counties, so much so that it is next to impossible to work the mines by shafts. Mr. James E. Mills read a paper before the American Institute of Mining Engineers at the Chicago meeting of 1884, in which he gave an interesting account of difficulties he met with in sinking a shaft in American valley, Plumas county. At 14 feet below the surface, the inflow of water was 67 cubic feet per minute. Similar experience has been made time and again in drift mining until it is now the rule to drive a tunnel often more than a mile

in length rather than attempt to work the claim by a shallow shaft.

Zircon (silicate of zirconia).—Zircon has never been found in place in California, but is common both in the deep and shallow placers. The localities are so numerous that it is not worth while to enumerate them. Zircon sand is so abundant that if it had a fixed value, tons of these minute crystals could have been gathered during the era of hydraulic mining. The crystals are so small that one not familiar with the mineral would mistake them for a rather peculiar sand. But when placed under the microscope, their perfection is revealed, and they are seen to be beautiful doubly terminated crystals. Their hardness is so great that they have successfully resisted the forces that ground softer minerals to a powder. I have recently found zircon crystals with gold in the Montezuma mine at Sulphur Creek, Colusa county; but as the formation is undoubtedly sedimentary, the zircons cannot be said to be in place, but were presumably deposited with the sands and silts in the bed of an ancient ocean.

Organic Remains and the Work of Human Hands in the Deep Placers.

Animal and vegetable remains are not uncommon in the deep placers of California, but I have been unable to obtain positive proof of the discovery of any implements used by man, in gravels covered by so-called lava, nor human remains in auriferous deposits in place, in any part of the State. I have for years kept this matter in view and eagerly sought information when instances were announced, but I have always met with an insurmountable doubt when the evidence obtainable was carefully considered and investigated. I am aware that others hold a contrary opinion, but I can only state my own experience.

Prehistoric relics have been found in riverbeds very many times, and on the bedrock of hydraulic mines frequently, but this does not by any means prove that they were placed there by man. On the contrary, it may be assumed that they were used and left on the recent surface and have fallen to the bedrock as the banks were piped away in the course of mining by that well-known process.

Instances have been recorded and seemingly substantiated in which they have been taken out of the gravel, but always, as far as I can gather, from or beneath a talus, and not in the undisturbed lava-capped gravels of the glacial channels.

Prof. Blake held the same opinion; for in a letter quoted in the MINING AND SCIENTIFIC PRESS, Vol. 21, Fol. 26, he thus wrote: "As the reported finding by Dr. Snell of the stone implements under the lava cannot be verified by any one who has long resided near and worked in the tunnels, I am disposed to conclude that Dr. Snell's relics have been washed out of earth taken from the outer slopes or margins of the lava capping, and that they are not as ancient as he believed them to be."

The most common organic remains found in the gravels are vegetable, and consist of the trunks of trees and leaves which have been frequently referred to in this paper. Another instance is stated by Mr. W. S. Chapmans, who informs me that in the Pioneer mine between Slate and canyon creeks, Plumas county, lying near the bedrock, a sandy stratum of pipeclay is found in which are interstratified leaves so perfect that when exposed to sunlight and heat they curl up as recent leaves would under similar circumstances. Whole trees changed to lignite are found on the same bedrock.

Buried forests exist in the glacial drift of Ohio (Geological report, 1870). In sinking wells, leaves, branches and trunks are met with at considerable depth. They are generally red cedar. A specimen recently sent me from this locality still retains the odor of that wood. In Highland county the water from some of the wells is unfit for domestic use, from saturation with organic matter. The following memorandum was sent to me by Mr. D. A. McCord with the specimen mentioned above: "Found in the bottom of the glacial drift on the high benches of the Talawanda near Oxford. This is the only tree found in its natural state. I dug it up myself and know there is no deception. The other piece represents the trees and timber found all through the drift which is in a chaotic state."

Full-grown trees in the glacial drift of California, Ohio and elsewhere prove that the glaciers, extensive as they no doubt were, did not wholly cover the land, but that trees matured in spite of them. In California, all trees so found are either wholly silicified or carbonized to lignite. They are generally conifers, those silicified showing sometimes the characteristic markings. A single tropical palm of considerable dimensions was found in Nevada county in a hydraulic mine. This seems to prove that during the life of the California glaciers, such trees grew in some part of the world, although this one may have drifted in the sea and been cast on the ice-bound coast of our State, as similar trees are now cast on the shores of Alaska by the Japanese currents. Microscopic sections from this tree are a very interesting study.

The reactions that cause the silicification of wood are not very well understood. The change is so complete in the California petrifications that no organic matter remains, but that the changes are gradual is proved by a specimen in a museum in Stockholm, Sweden, seen and thus described by Thomas Thomson ("Travels in Sweden in 1812," fol. 105): "One of the greatest curiosities in the cabinet of the

College of Mines was a large specimen. It consists of a large piece of a tree; in the center it is perfect wood; as we approach the circumference it becomes more and more petrified, and there is a zone more than two inches thick of perfect wood stone. This specimen has been long in Stockholm. Mr. Hjelm knew nothing of its history except that it came from China."

Prof. T. Sterry Hunt, at a meeting of the American Institute of Mining Engineers held in New York, referred to a paper on this subject by himself, and expressed the opinion that the woody tissues were "successively filled and replaced by silica which is set free in a soluble form by the decay of the silicates in the gravels."

The lignites are in a very singular condition. One specimen, to which my attention was called by Mr. J. A. Edman of Plumas county, seemed to be, when first found, a mass of black matter which cut like tallow but hardened on exposure. It is to all appearances perfectly amorphous, but on being cleanly dressed by planing, the wooden texture appears, and so perfectly that the specimen thus prepared seems a block of wood blackened to resemble the bog oak of Ireland. This specimen is so interesting that it is a pity it cannot be seen by more of those interested in such matters.

The Irrigation Surveys.

Those who have looked forward to speedy results from the inception of surveying for irrigation of arid lands by the Geological Survey will be sorry to learn that the work must stop, temporarily at least, unless the present Congress makes provision at once for its continuation. It seems that there is considerable difference of opinion among the Washington Solons as to what steps the Government should take. Intimation of this has been had from time to time by telegraph, but a better view is given of the situation by Wm. Hammond Hall, who is in charge of the west division reaching from Utah to the Pacific. In an interview with a *Chronicle* reporter, Mr. Hall is represented as making the following statements:

"Work has been practically suspended and will not be resumed until some favorable legislation by Congress. All the work here is being done by one clerk and myself. I have plenty to engage my own time in the engineering problems developed in the surveys of last year. A party of three or four engineers and hydrographers are doing some gaging work on the Carson and Truckee rivers, and similar parties are at work on the Snake, Feton and Fall rivers in Idaho and in Utah and Arizona. That is all that has been done since November. The last appropriation is practically exhausted, and the prospects of the work are in a very muddled state. There seems to be considerable difference of opinion between some of the members of the Arid Lands Committee and Director Powell of the survey as to how the survey should be conducted, and there are also differences of opinion among Senators and Representatives generally. I believe some of the Arid Lands Committee think that Director Powell has been making it too much of a scientific survey in place of a plain, ordinary irrigation survey. Mr. Powell's ultimate policy is set forth in the Reagan bill, which is one of the four or five bills which have been introduced. The opponents of that view generally support Plumb's bill. Some are in favor of turning the survey over to the Agricultural Department; some want the arid lands turned over to the States and Territories, and among the other problems involved are the questions as to whether the Government shall direct the survey and legislate regarding irrigation and water rights, and what that legislation shall be. These differences of opinion regarding the scope, character and ultimate policy of the survey are the reason for the backwardness of the work."

It is unfortunate for this work that this is the case, for twice as much work could be done in the next 90 days as in the 90 days following. The weather would be more favorable, and the next 90 days is the only time of the year to study the flow of streams."

We trust that something will be speedily done by Congress, so that the short season for field-work may not be permitted to pass without progress.

Advantages of Advertising.

The advantages of advertising were never, perhaps, better illustrated than in a recent incident connected with the Pelton Water Wheel Co. of this city. A letter of inquiry from South Africa was not long ago received by this company bearing the indefinite inscription, "Manufacturers of the Pelton Water Wheel, United States of North America," and it came straight through to destination as promptly as though it had borne every particular of the address down to street and number.

The company referred to, having a wheel of extraordinary merit, have availed themselves of the advantages the MINING AND SCIENTIFIC PRESS and other newspapers offer to advise the general public of this fact, as well as of their whereabouts, with the result that even the postoffice clerks know just where to send a misdirected letter. It may also be stated in this connection that the inquiry above referred to resulted in a valuable order as soon as the desired information could be obtained.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

AMADOR GOLD MINE.—*Ledger*, May 3: There are 12 men working underground. The rock-breaker is being received at the mill; the heaviest piece, said to weigh about four tons, is still at Ione, but an effort will be made in a few days to haul it. The date for starting the mill, owing to unforeseen delays in regard to the track and other matters, is fixed for the 15th of the month.

NEWTON COPPER MINE.—Very little is said about this property, but work is being carried on all the time, sufficient to enable shipments of ore averaging 8 tons per month to be made. They are still working on the large pile of ore on the dumps, and there is enough out to run them a long time yet. Only two men are employed in the process of transforming the ore into copper. Scrap tin is still employed in the sluices instead of iron formerly used, not because it more readily causes the precipitation of the copper, but because it is much easier handled. It can be turned over in the boxes by means of forks, without necessitating contact with the hands, which the heavy iron pieces involved. As much as 25 tons of refuse tin has been received at a time from San Francisco for these works.

MISCELLANEOUS.—The work of changing the concentrators at the New London mill is just completed. A new style of concentrator was tried, and the mill was equipped throughout with the new-fangled thing. They have proved unsatisfactory, and have been cast aside to be replaced with the old reliable Frue. A cave occurred in the shaft of the South Spring Hill mine early this week, involving two sets of timbers. The men were laid off one day. The trouble was not serious, and everything is now in running order again. Taking out the water at the Hardenberg mine at Middle Bar is proceeding slowly. The flow of water is very strong. It is reported that a crushing of 100 tons of rock from the Drytown Consolidated mine will be made at the Cosmopolitan mill. The large casting of the rock-breaker for the Amador mine was brought from Ione on Wednesday by Chichizola's team of 10 animals. It weighed from 6 to 7 tons.

SUTTER CREEK.—*Cor. Ledger*, May 3: The mining outlook is improving steadily. There is talk of adding 20 more stamps to the Wildman. The development of the mine would seem to justify this enlargement of the milling capacity. Sinking at the North Star is progressing satisfactorily; the nature of the ground is such that they are able to make fair headway. The rock that is being extracted from the Lincoln is improving in quality.

Fresno.

QUARTZ AND PLACER.—*Visalia Delta*, May 4: Mr. Rowland intends leaving for his gold mine in Fresno county in a few days. His partner in the mine, James Bridges, is in town this week. The mine is located on Laurel creek, 65 miles from Fresno. It is both a quartz and placer mine. At a cleanup a few days ago, \$285 worth of free gold was taken out. Mr. Rowland is quite sanguine over his prospects. He is satisfied that they can wash out from \$75 to \$30 worth of gold a day now. Snowbanks have to be crossed yet in order to reach the mine.

Inyo.

FISH SPRING HILL.—*Inyo Independent*, May 3: Henry Melone and C. L. Fuller have sunk 50 feet on the ledge recently discovered by them at Fish Spring hill. A crosscut of 25 feet has not reached the hanging wall of the ledge. An old miner who visited the mine lately says the great body of ore in sight will average \$15 per ton in gold. The ore can be worked very cheaply.

GAULAN.—Archie Farrington had men at work some weeks past prospecting the Gaulan mine. The men were stopped from work last Tuesday, as nothing is in sight that would warrant doing more.

CERRO GORDO.—Nothing but prospecting is reported from Cerro Gordo. No ore is being taken out except by a very few tributaries, who are working on claims belonging to the company, and these are not taking out much.

SALINE VALLEY.—W. C. Chapin got back to town last Tuesday from Saline valley. He spent about two weeks over there examining mines. He is well satisfied with several prospects he examined. Mr. Chapin spent some time at the borax works of Conn & Trudo, and is fully satisfied that they have a property of great value.

MINNETTA.—The ore body recently struck in the Minnetta mine, Modoc district, by J. J. Gunn, is reported to be opening up better every day. A miner who came in yesterday was at the mine last Tuesday, and says it is a fine-looking body of ore. Frank Fitzgerald is shipping an average of a carload of ore each week. The ore is reported to net \$200 a ton. In the mine at Lookout, Mr. Fitzgerald is reported to have a fine-looking body of ore in sight. At both these camps more men are wanted; 12 or more good miners would at once be employed, and at least an equal number of men are wanted to work outside.

THE JIGGING PROCESS.—*Inyo Independent*, May 3: The process of jigging low-grade lead-silver ores, though long practiced in other regions, is only beginning to be generally used in Inyo county. An improved machine was delivered at Keeler last Wednesday, for use in the Defiance mine at Darwin. At this mine there is ore enough on the dump and in sight in the mine to supply 30 tons of good jigging ore every day for an entire year. The ore after leaving the machine will average \$120 per ton. After deducting all expenses of mining, jigging, shipping to San Francisco, and working, the ore will leave a net profit of \$60 per ton. Hitherto only the richest of the ores have been taken from Inyo county mines, and these were picked by hand, thus greatly increasing the expense. In ledges 10 or over 20 feet thick, a vein of a few inches of high-grade ore was all that was taken out for shipment; the vast mass that remained was all lost. By the jigging process hand-picking is all done away with; all the ore is taken out and the metal saved. This will make a very great change in our whole system of mining. Many more men will be employed, making much greater demand for all kinds of farm produce, and mines will be worked that under the old wasteful way

would not pay expenses, not to speak of leaving any profit. This improvement will lead to much greater development of mines and so increase the probabilities of finding immense bodies of rich ore, such as that found at Cerro Gordo years ago. Mr. Reddy says he will use all the profits from the jigging process at the Defiance in further development of the mine.

Nevada.

THE NEW FIND IN THE IOAHO.—*Grass Valley Union*, May 2: The new ore body recently opened up on the 17th level of the Idaho mine gives no signs of "petering out," as the drift has been run into it a distance of 30 feet and the ore continues of the same character, being highly sulphureted and prospecting finely in gold. This ore body has strong alternate mineral streaks a foot or more in width, and white quartz, but both the quartz and the mineralized ore contain gold, although the quartz streaks are not as rich as the other in the precious metal. In drifting, the whole of the vein is not being taken out, as it is too wide, but crosscuts will be made as the drift progresses to determine whether the vein holds its present width. Appearances now are that this is a well-defined ore body and not merely a hunch, as was at first supposed.

Placer.

ON THE DIVIOE.—*Placer Herald*, May 2: A. Breece called on us while on his way from Bath to San Francisco last Wednesday. He tells us that the Breece & Wheeler mine is panning out its usual handsome returns. The gravel is running over \$30 to the car, and for the month of April they will declare a dividend of \$10,000, or \$5000 for each of the owners. The Hidden Treasure mine at Sunny South, he tells us, according to his information, is keeping up its old-time reputation for richness. At the Mayflower, he understood, they were running drifts and opening up in good shape.

Shaft.

DRY PROCESS.—*Redding Free Press*, May 3: The working of ores dry, it is thought by some, will soon take the place of wet working. The new reduction works now being built at Redding are for dry working entirely. The Calumet Co. will start its new dry-working mill on Monday, the 5th of May. This mill is for working ores by the Paul dry amalgamating process, which gave such large results over wet battery work last year.

Sierra.

RED OAK.—*Mountain Messenger*, May 2: Jo Lavezzola, in accordance with instructions by telegraph from Carson, Nevada, has put on a new force of men at the Red Oak drift mine.

Trinity.

JUNCTION CITY.—*Cor. Trinity Journal*, May 4: Most of the mines are and have been running steadily throughout the winter, except the Red Hill gold mine, which receives its supply of water from Canyon creek, the delay being caused by the heavy fall of snow at the head of the ditch and numerous breaks and slides. Although the work of repairing the damage has been going on for the last two months, the water was not turned on till within the past week. Good work can yet be done in the mine, as the season will be much longer than usual. All the mines are doing well with the expectations of more than the average amount of bullion at the final roundup.

LARGE ENTERPRISE.—*Journal*, May 3: Supt. O. P. Powers of the Lower Trinity Tunnel Co. informs us that everything is progressing satisfactorily in his vicinity. He has 30 men getting out timber, cutting lumber, building flume, cleaning out ditch, etc. Mr. Powers says that he will have the water on the Taylor Flat hydraulic mine by the middle of July, and will then have sufficient water to run the claim till the fall rains. As soon as the water is brought on the claim he will commence sluicing; he will open the mine at the lower end of the flat, and in the opinion of the mining men acquainted with the ground, will develop a good property. Mr. Powers says that he thinks the amount of water in the river will hardly admit of working the river-bed this season, if it can be worked at all; it will be late before the tunnel will be able to carry the water of the river. Last year, which was an exceptionally dry season, the tunnel did not carry the waters of the river till the middle of July. However, the company will not lose any time, as it can operate extensively on the Taylor Flat mine this summer. It is possible that work can be done on the river-bed by September; elevators will be used to work the bed.

Tulare.

CORONADO.—*Visalia Delta*, May 4: The Coronado mine near Clough's cave is booming; galena and a high grade of ore has been struck at a depth of 12 feet. The proprietors, J. C. Swickard, M. P. Leshner and Joe McKimmie, are sinking a shaft by the river-side. The mine is incorporated. M. P. Leshner of Tulare is president, E. M. Jeffers of Visalia secretary, I. T. Bell treasurer, and J. C. Swickard superintendent. Considerable stock is being sold to develop the mine.

NEVADA.

Washoe District.

SIERRA NEVADA.—*Virginia Enterprise*, May 3: The southwest drift on the 630 level is still in a porphyry formation. This porphyry carries some water.

UNION CON.—East crosscut No. 1 on the 1465 level is being advanced in porphyry, after having (last week) passed through a seam of clay about one foot in width.

MEXICAN.—West crosscut No. 4 on the 1465 level is in vein porphyry that carries some small seams of quartz.

UTAH.—The west drift on the 725 level is making fair progress without change of material worthy of note.

CON. CALIFORNIA & VIRGINIA.—The 1300, 1500 and 1600 levels continue to yield the usual quantity of ore. On the 1435 level west crosscut No. 3 from the main west drift still continues in porphyry and quartz of a promising appearance. On the 1600 level some good ore is being found in the old stopes. Ore of fair quality is being extracted from the 1650 level at several points. The usual amount of ore is being shipped to river mills, and the average assay will be about the same as last week.

OCCEIDENTAL CON.—The stopes on the 400 and 450 levels are still yielding ore of a good quality.

A good deal of prospecting is being done and milling ore has been found at several points.

OPHIR.—Some ore of good quality is still being found on the 1300 level. A considerable amount of prospecting is being done.

CON. IMPERIAL.—West crosscut No. 3 from the 300-foot level north drift (Yellow Jacket level), which is the 750 level of the Imperial, is out 48 feet, having been commenced during the week. The face shows quartz and porphyry. The joint Confidence, Challenge and Imperial north lateral drift on the 800-foot level is in 138 feet from the north line of the South Challenge, 43 feet having been added during the week. The face is in porphyry.

CHALLENGE CON.—The prospecting work joint with the Confidence is progressing well. The drifts and upraises are in promising ground at several points, it being a mixture of quartz, clay and porphyry.

CROWN POINT.—The raise from the 400 level is passing into quartz that carries metal. The west crosscut on the 300 level is still in favorable ground. Are shipping to the mill nearly 900 tons of ore a week, the average of which is, by battery samples, nearly \$19 a ton.

GOULO & CURRY.—On the 400 level at a point in west crosscut No. 1, 587 feet from main south drift, northwest drift was started and advanced 18 feet. Formation, hard porphyry.

KENTUCK.—The 900 level is looking well, and the winze below the 950 level continues to show good milling ore.

OVERMAN.—The incline winze on the 1200 level continues in ore of a good quality. The ore breasts on the 1200 level are looking well and regular shipments are being made to the Vivian mill. The ore runs high in gold.

HALE & NORCROSS.—Ore is being extracted from the 400 and 1300 levels and sent to the Nevada mill. A good deal of prospecting is being done on the 500, 750 and 1200 levels. The average of the battery assays is \$17.54 a ton.

BELCHER.—The southwest drift on the 200 level is being advanced in quartz of a low grade mixed with seams of clay. The drifts on the 300 and 850 levels still continue in porphyry and clay.

JUSTICE.—On the 62d level, raise No. 1 is up 75 feet and shows low-grade quartz. Shipped to the mill during the week 199 tons and 860 pounds of ore, the average battery assay of which was \$27.97 per ton.

SEG. BELCHER.—On the 1000 level the south-east drift is still in low-grade quartz.

ALTA.—The ore-producing sections are looking well. The mill works an average of 45 tons a day and the ore pays about \$20 a ton.

YELLOW JACKET.—The usual shipments are being made to the Brunswick mill. The ore averages about \$20 a ton.

CHOLLAR.—On the 750 level the south drift is still in ore that averages about \$30 a ton. The prospecting drifts on other levels are without change, being still either in porphyry or porphyry and quartz. Are extracting nearly 500 tons of ore a week.

POTOSI.—The winze below the 900 level shows quartz that yields good assays. The raise above this level has passed through the quartz and entered the porphyry. On the 850 level all is about the same as last week.

ALPHA.—South lateral drift, 600 level, is out south of shaft 53 feet; face in porphyry. The east crosscut opposite the shaft, 600 level, is out 36 feet; face in porphyry.

SILVER HILL.—All prospecting operations going on as usual without change of formation.

JULIA CON.—Work is going on in the north-west drift, 800 level, as usual.

WARO COMBINATION SHAFT.—The east drift from the shaft, 1800 level, is out 353 feet; face in porphyry.

NEW YORK.—On the 650 level the west drift is in material that carries some metal. On the 850 level the north drift is in a mixture of clay and quartz. On the 950 level the south lateral drift is still showing quartz that gives low assays.

SCORPION.—On the 630 level the southwest drift from the shaft is now advanced 328 feet, continuing in a porphyry formation.

ANDES.—Past week extended north drift on 420 level 107 feet. Formation, clay and porphyry with seams of quartz. Repairing and cleaning 175 level. Main drift progressing favorably.

SAVAGE.—Are extracting ore from the 400, 500, 600 and 750 levels, and are running prospecting drifts on each of these levels. The north drift on the 334 level continues in porphyry. Are milling about 450 tons of ore a week. The average of the ore is \$23 a ton.

BEST & BELCHER.—On the 1000 level, east crosscut No. 1 has been extended 9 feet; total length, 367 feet. Formation, hard porphyry. The joint west crosscut on the south line has been cleaned out and repaired 40 feet. On the 1200 level the north drift has been cleaned out and repaired 22 feet; total distance, 645 feet.

Cherry Creek District.

EXCHEQUER.—*White Pine News*, May 3: Mose Scramlin is in from Cherry Creek. He informs us that the Exchequer lessees have developed a body of ore in that mine and that their prospects for making some money are good. They have increased the force at the mine and are now working 12 or 13 men. They expect to start up the Ti-cup mill in a few days.

Comet District.

GOLD.—*Pioche Record*, April 25: A fine vein of gold ore has recently been discovered in Comet district, which assayed \$36 per ton. Heretofore assays have not been made for gold either in this district or Irish mountain, though indications point to such deposits.

Ely District.

QUET.—*White Pine News*, April 29: Mining matters in this district remain in statu quo. That is, we have nothing new to report in the way of development or sales. The Rob Roy, which was reported sold for \$40,000 in our last, turns out to be true only in part. Only a third interest in the property changed hands, and it is said the proceeds of that interest will be applied to putting up a mill.

Eureka District.

THE DIAMOND.—*Eureka Sentinel*, May 3: Messrs. R. MacIntosh and R. C. Chambers, of Salt Lake, have spent the greater part of the week here inspecting the Diamond mine which they purchased

last fall. The work of development has progressed favorably during the winter, under the direction of Supt. Chas. Read and Foreman Maurice Hartnett, and the owners now feel justified in undertaking deeper explorations. Accordingly a tunnel has been started at the base of the mountain which will render possible the prospecting of a vast vertical section. The length of the tunnel at a point under the apex of the mountain will be approximately 1700 feet. Ground was broken on this important work during the week. Machinery is to be erected and Burleigh drills driven by compressed air are to be used. It is believed that the main tunnel can be completed in four months after the machinery shall be in readiness. It is not to be a mere straight hole into the mountain, but the ground is to be crosscut in all directions. We regard this as the first thorough test to determine the real value of Prospect mountain. In this view the work becomes one of the most important ever inaugurated here. If great ore bodies should be developed in the heart of the mountain, as we believe there will be, a new lease of life will be given to Eureka District, and the old prosperous days of the past may again revisit us. The inauguration of this new work will afford employment for an increased number of men during the summer.

A DEVELOPMENT IN THE EUREKA CON.—The *Sentinel* learns of a development of a new ore body in the Eureka Con. Mine. It is located in the ground formerly belonging to the K. K. Company. The size of the new find is said to be about nine feet in thickness, so far as known, with evidences of still further improvement. There is plenty of virgin ground in the vicinity to contain a good-sized bonanza. It would be a great thing for the camp if some of the old-time ore bodies could be unearthed in the Eureka Con. There were acres of ore on some of the levels of that mine.

ORE AND LEAD.—The ore shipments to Salt Lake this week have amounted to 51 E. & P. carloads. There was also considerable ore shipped by the Ruby Mining Company from the Dunderberg mine to the Eureka Con. furnaces. The E. & P. Railroad Co. pulled out seven carloads of Eureka Con. lead (old stock) during the week.

Pahrnatagat District.

SILVER.—*Pioche Record*, April 25: Tom McDonald came up from Pahrnatagat last Friday with a batch of ore from his Fantasmagoria mine, which pulped 525 ounces in silver per ton. A few more such shipments will cause a stampede to Irish mountain.

Pioche District.

THE LOST LEOGE FOUND.—*Pioche Record*, April 25: It is rumored on the streets that Supt. Sam Godhe of the Pioche Consolidated and Yuba Cos., has discovered the long-lost Raymond & Ely ledge between the 9th and 10th levels. The ledge was discovered through a fissure leading into the foot wall and extends as far as prospecting into the old Meadow Valley ground. The vein is five feet in width, and assays up in the hundreds. The ore is free milling.

Seligman District.

SLUICING.—*White Pine News*, May 3: The Robinson Canyon Con. Co. have been busy for the past four or five days and nights sluicing gravel from Shaft No. 2, with a good headway of water. They are in high anticipation over the outcome.

Tybo District.

THE DIMICK.—*Eureka Sentinel*, May 3: Mr. Leet of San Francisco returned during the week from Tybo. His business was to inspect the Dimick mine in the interest of parties desiring to purchase a good mining property. It is understood that he found the mine to be even better than had been claimed for it. There is no doubt that he will make a strong favorable report on the property which will most probably lead up to its early sale. The great beauty of the Dimick mine is that there is no risk about it. It is a true fissure vein of great ascertained and prospective value. It is on the same ledge with and is the westerly extension of the celebrated Two G mine, which yielded over four millions above the 400-foot level. The Dimick mine has a better future than its neighbor. The location is more favorable and the ore of higher grade. It will be a good thing for the southern country when this magnificent mine shall pass into the hands of a strong company. Tybo is likely to be a busy camp again before the season is past.

ARIZONA.

GRANVILLE.—*Clifton Clarion*, April 26: W. F. Hagan of Granville camp is working six men, driving a tunnel to cut the 100-foot shaft. Granville is a silver camp, and a good one, too. Mr. G. M. Forbes has bought some property in this camp and bonded 11 claims.

ACTIVITY IN MOHAVE CO.—*Cor. Kingman Miner*, May 3: For several years past three large teams, one a 14-mule with three wagons, and two 10-mule teams of two wagons each, together with several two and four-horse teams, were able to handle the ore and freight of Mohave county. During the past winter there were two months lost time on account of heavy rains and bad roads, so that ore and freight accumulated, but miners generally were confident that there would be an advance in the price of silver. As the weather got settled and the roads got good, men owning teams began to increase their capacity. At present there are six instead of three large teams at work besides several small teams, and there is much complaint among miners that they cannot get their ore hauled. The advance of silver will soon wake up the old camps. A ready rumor has it that the McCracken and Feabody will again start up. These mills (one a 15 and the other a 20-stamp) will again be repaired. They have only laid off on account of the low price of silver. These mines contain mountains of ore of fair grade. It is rumored that a water-power will be improved on Burro or Sandy creeks and an electric plant will be put up, thus saving the high price of wood. Aside from these mines, the O. K. and the Music Mountain M. Co.'s properties, the Flores and Oro Plata, between this place and Mineral Park, are putting up large hoisting works and it is expected that they will put up large mills. At the present time all the miners that are at work are doing remarkably well. Owners of silver mines are in high spirits and they all have a smile on their countenances, and well they may have, for the advance in silver makes low-grade ore pay and high-grade ore in proportion. It is more than probable that

within six months from this date there will be three times the amount of labor employed in Mohave Co. that has ever been since the location of the mines, 25 years ago.

HYDRAULIC.—Prescott *Journal-Miner*, May 3: The Lynx creek hydraulic works were closed down fast Friday on account of failure of water. They had a very good run during the season, washing out several thousand dollars in gold. Messrs. Chambers & Charmick of Lynx creek expect to start up the Low-ell mill soon again. They are only awaiting oow the arrival of parts of the machinery from San Francisco. Operations were commenced in the Ryland mine again last week. The mill is also being put in shape to start up soon. The camp promises to become even more lively than it was before. Supt. Kiley of the Ryland mine has returned from his trip East and has gone out to the mine. Officers of the company are expected soon, and it is said that they contemplate making some very extensive improvements to the mill, probably doubling its present capacity.

GOLD.—Prescott *Courier*, May 5: Judge Richard DeKuhn, superintendent of the Mocking Bird mill and mine, deposited some 35 ounces of gold at the Bank of Arizona Saturday last. He is rustling animals to pack ore to the mill. Mr. Gillespie, of Congress City, was here Saturday last and stated that the mine is in a very healthy condition. Teams are almost every day bringing in sulphurets. Senator people are not given to praise of the mine, but it is leaked out that the recent strike is rich and big. It was found 300 feet below the grass roots. Supt. Kiley has a large force on the Ryland. Forty stamps will soon be crushing ore. Bradshaw district's three mills, the Crown King, O. B. La and Del Pasco, are hard at work. Clean-ups good. Tip Top district miners are taking out and shipping about \$15,000 worth of silver ore each month. Lowell mill, Walker district, is idle, lessees awaiting the arrival of some machinery from San Francisco. J. W. O'Bryan is taking good ore out of some of Old Grizzly's mines, in Walnut Grove district. Old Grizzly himself hopes to return, soon, prepared to open other mines. fllside mine is yielding more first-class ore than can be hauled to the railroad. The rise in the price of silver is having a good effect in our Territory.

BRITISH COLUMBIA.

GOLD AND SILVER.—Kamloops *Sentinel*, May 3: Recent investigation shows that there is in Kere-meos and Simalkameen gold quartz, assaying from \$24 to \$174 per ton. Rock Creek also has gold quartz, assaying from \$35 to \$300 per ton. Mr. G. Douglas has been working one of the principal mines for a New York Co. for the last four years, and is now in the East to bring out milling machinery for the purpose of reducing the ore, of which there is a great amount already on the dump for milling and plenty in the mine. W. A. Jowett, of Revelstoke, has just returned from England, whither he went in connection with some mining property in the vicinity. In Winnipeg, to a reporter, he said that as the richness of the British Columbia mines becomes known, less difficulty is found in London in obtaining capital, and already English syndicates have bonded a number of mines. Mr. Jowett has great confidence in the mining future of British Columbia. The silver-ore ledge recently discovered at Bowen Island is now found to be from five to seven feet wide, running in a northeasterly direction and standing nearly perpendicular. It crosses the island in an oblique course from shore to shore. The foot-wall is granite and the hanging-wall is shale, so that it can be easily traced on the line of contact between the two. The rugged ridge facing Bowen Island on the mainland will surely reward the prospector, for there is and must be copper ore.

COLORADO.

THE JUSTICE.—Aspen *Times*, May 3: It appears that the Justice is still under partial restraint. The company's attorney agreed not to work more than six men on ore until May 15th. It is altogether possible that, after that date, the company will be entirely free.

TO BE LISTED.—The stock of the Park Consolidated Mining Co., which owns the Buckhorn, Castle No. 2 and Tanner claims, will probably be listed on the Denver Exchange.

THE LITTLE RULE.—Reports from the Little Rule are very encouraging. The ore that is being taken from the new discovery attracts attention wherever samples of it are shown. If the streak holds out, as it now promises to, it will soon bring the mine into great prominence.

DAKOTA.

SYNDICATE SMELTER.—Deadwood *Pioneer*, May 3: Nate Wilcox has been at work at the smelter for some 15 days past. Foundations for the two engines and boiler, new ore bins, new crusher, platform scales for ore-wagons, coke-houses, etc., are all ready, and yesterday Dr. Carpenter received a telegram announcing that the long-delayed machinery had at last been found and started on from Chicago. It is very annoying, as his agreement called for complete works, running full capacity by the 10th of May. The time will now, necessarily, be extended.

IDAHO.

THE SEVEN DEVILS MINES.—Boise *Statesman*, May 4: The prospects for Weiser and Washington county are exceedingly bright this summer. Mr. Kleinschmidt and a party of Montana gentlemen passed through Weiser recently en route for the Seven Devils mines. They informed our correspondent that 20 teams are now on the way from Montana, that have contracted to haul 20,000 tons of ore from the mines to the new steamboat on Snake river. Experts say that \$1,200,000 will be realized from the Peacock mine this summer, leaving 55,000 tons of ore still in sight. This is Lui Allen's old mine, and is doubtless the richest copper mine in the world. It is estimated that from 10,000 to 15,000 people will go to the mines of the Seven Devils district this year. Prospectors are daily going in that direction from Weiser.

THE BANNER MINES.—Henry Hammond, who

has charge of a sawmill in Banner Mining district, owned by the Elmira Silver M. Co. of N. Y., said that the little mill would have to be moved about three miles this spring for the reason that the country around where it now stands had been almost entirely denuded of timber. After its removal it will be one and a half miles from the mines. The Banner mine is not being worked. It was rich enough, but the machinery on the ground was not powerful enough to keep the water out below the 500-foot level. As soon as John Brown, the superintendent, returns from the East, it is expected he will have 100 feet lower sunk on the lode. The Wolverine and Crown Point are adjoining lodes, nr, perhaps more properly described as claims upon the same lode. They are both worked from one shaft and that is sunk on the Wolverine; 1100 tons of good, rich ore that will average \$100 to the ton is now lying on the dump. About 20 men are now at work in this shaft, and some ore being added to the already large pile, though the men are generally engaged in deadwork. It is intended to sink this shaft another hundred feet this season.

MONTANA.

THE SILVER BOW HYDRAULIC.—Butte *Miner*, May 3: Work on the Silver Bow Hydraulic Company's property, which consists of 2500 acres of placer ground located between Rucker and Silver Bow, will be commenced on or about the middle of the month. This is one of the greatest placer-mining enterprises ever inaugurated in Montana, and will undoubtedly yield many thousands of dollars to the projectors, as the ground will be worked on an extensive scale. The new ditch, which is calculated to carry 800 inches of water from Freely's station to the top of Rucker Hill, a distance of 20 miles, is now almost completed by Mr. Winters, the contractor.

NEW MEXICO.

DIVIDEND.—Silver City *Enterprise*, May 2: W. C. Hadley, superintendent of the Lake Valley mines, informs an *Enterprise* man that his company paid a dividend of 5 cents per share, \$25,000, in April, and had enough stuff on hand to declare another dividend. Tom Knott called at this office last Tuesday and reported a strike of rich gold ore recently made by him in the Burro mountains. The money was paid yesterday on the zinc mines mentioned in our last week's issue, about \$25,000 in all. J. W. Fredericks, who is now operating at Stein's Pass, states that there is more activity at the Pass than for some years past. Mr. Bowman of Colorado has recently acquired some valuable zinc properties there, and is preparing to ship the ore in large quantities. The *Enterprise* reporter was shown a pretty little gold retort of 10 ounces by Idus L. Fielder. The gold was the mill return from eight tons of ore taken from the Esperanza mine by leasers to whom the Mammoth company has let the mine on tribute. The Pacific company has started hauling ore and will start five stamps of their mill to-day or to-morrow. The other 15 stamps will be started as soon as the vanners for the concentration of the tailings from them are in readiness to work. Four vanners are now in place and four more will be added, when the mill will be run to its full capacity. There is an abundance of ore of good grade in sight. James Sullivan and Jerry Clarke are working the Never Fail mining claim in Gold Hill district with very satisfactory results. A good streak of ore has been exposed to all the workings. A carload of ore taken from a slope in the drift, and now on the dump ready for shipment, carries 35 per cent lead, 8 ounces gold and 13 ounces silver per ton.

OREGON.

BLUE RIVER MINES.—Cor. *Oregonian*, May 2: There was a company organized in Brownsville last night which deserves more than passing notice. For several years past there has been some prospecting for precious metals on the head-waters of the Calipooia and Blue rivers, but no very great amount of money or labor has ever been spent, and yet very flatter ing prospects have been found and now an effort is going to be made in a somewhat different way. Twenty of the leading claims in these districts have been consolidated, and papers have been made out incorporating them all into one company, to be known as the Calipooia and Blue River M. & M. Co. The following are the elected directors for the coming year: N. B. Standish, C. H. Elswick, J. J. White, W. B. Blanchard, and W. W. Robe; George A. Dyson secretary, and C. H. Cable treasurer. As soon as the weather and roads become settled, a force of men will at once be sent to the coal mines and work commenced in earnest.

UTAH.

A REVIVAL OF INTEREST.—Salt Lake *Tribune*, May 2: There is a revival of interest in mining which bodes good to this country. The old camps are being looked over by both old citizens and strangers in search of good properties. The rise in silver and lead, and the belief that mining is going to pay better in the future than in the past, is what has lately stirred up this interest. A big Colorado syndicate has a man in the field who has just looked over Dry Canyon, Ophir and Stockton, and believing that a railway west is one of the early probabilities, he has gone to Dugway, Deep Creek and other localities which are destined to become big contributors to this market. The warm days of the past week have started out many of our old prospectors to follow up the snow line as it climbs up the hills. Reports from the mines assert that there are large blocks of stoptog ground exposed in them, and there is good promise of a lively season and big output from nearly all the mines being operated in Utah. The four months of this year have yielded in bullion (excluding all ore exports), \$1,018,833.08. The receipts of the metals in this city for the week ending the 30th, inclusive, were to the total value of \$153,480.92, of which \$87,289.92 was in ore and \$65,191 was in bullion. For the previous week the receipts were \$73,585.74 in bullion and \$25,998.92 in ore, a total of \$99,584.66. The product of the Ontario for the week was of bullion, 17,436.06 fine ounces. Bullion receipts in this city for the week were to the value of \$26,305; base bullion, \$9900; Ontario bullion, \$17,436. The Hanauer smelter produced during the week bullion valued at \$13,225.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Daway & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING APRIL 29, 1890.

- 427,029.—FAUCET FILTER—Frank Bardez, S. F.
426,767.—MITER BOX—J. E. Bundy, San Rafael, Cal.
426,920.—HORSE-CLIPPING MACHINE—E. A. Cochran, Pasadena, Cal.
426,664.—WATERING-CART—P. B. Donahoo, Fresno, Cal.
426,718.—PURIFYING WATER FOR BOILERS—Chas. Elliot, S. F.
426,667.—MEASURING FUNNEL—W. H. Grissim, Santa Rosa, Cal.
426,726.—SHAFT FOR VEHICLES—W. Holloway, Gilroy, Cal.
426,502.—CALIPER—T. Isaac, Sacramento, Cal.
426,939.—SAFETY PLUG FOR WASH-BASINS—D. F. Jones, S. F.
426,592.—VENT-STOPPER FOR ORDNANCE—Jas. Kelly, San Diego, Cal.
426,593.—DEVICE FOR LAYING GUNS AT ANY ANGLE—Jas. Kelly, San Diego, Cal.
426,603.—HOP-PICKER—Peterson & Clark, Santa Rosa, Cal.
426,681.—DREDGER—W. R. Pless, San Joaquin, Cal.
426,683.—LUNG-TESTING TOY—S. H. Pratt, Strawberry Valley, Cal.
426,739.—DISH-WASHING MACHINE—T. A. & H. W. Pudan, Sacramento, Cal.
426,478.—FRUIT-DRIER—G. W. Thurston, S. F.
426,885.—ELEVATED CABLE ROAD—W. P. Wallig, Santa Monica, Cal.
426,886.—SELF-OILING CAR AXLE—A. A. Weber, Sacramento, Cal.
426,804.—COMBINED AX, HAMMER AND MAUL—C. H. Williams, Prineville, Oregon.

The following brief list by telegraph, for May 6, will appear more complete on receipt of mail advices:

- California—Calvin Brown, San Francisco, apparatus for submarine exploration; Preston G. Gestford, Jr., Napa, adjustable bed bottom and brace; Jacob Harps, S. F., band truck; Samuel F. F. Mobill, assignor of one-half to J. R. Fritz, S. F., street-sweeping machine; Ellsworth D. Middlekutt, Stockton, automatic cork-puller; Henry D. Beaves, Monticito, fruit-gatherer; William H. Shannon, Stockton, assignor of one-half to J. H. Crystal, Corra, carburetor; Ektor R. Shaw, S. F., assignor to Mosher, Shaw & Craig, San Jose, drier; John C. H. Stot, S. F., telephone; John C. H. Stot, S. F., cable-tightener for cable railways. Oregon—Andrew M. Roberts, Mitchell, tool for trimming horses' hoofs; Daniel Siddall, The Dalles, dental elevator; William T. Sterling, Enterprise, harrow.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

SACK-HOLDER.—Alexander McDonald, Franklin, Sacramento Co., Cal. No. 426,208. Dated April 22, 1890. This invention relates to that class of implements which are designed to hold a sack with its mouth or opening properly spread under a discharge spout, whereby grain and other material are delivered to it. The invention consists in a frame having arms by which it is secured to the chute or spout, said frame having in one side fixed teeth or tines for engaging one side of the sack, and in its other side a rock-shaft provided with teeth for engaging the other side of the sack, said shaft having a lever by which it is rocked, whereby the teeth are caused to stretch and hold the sack, and in a means connected with said rock-shaft for operating automatically the on-off gate or valve of the chute or spout.

WATERING-CART.—Peter B. Donahoo, Fresno. No. 426,664. Dated April 29, 1890. The invention consists of one or more axially rotating water vessels or receptacles traveling on the ground and provided with draft connections by which they are drawn, said vessels or receptacles having interior diaphragms or partitions dividing them into compartments. Through these vessels or receptacles passes a pipe having openings in its top, and having connected with its center a perforated discharge pipe and an inlet pipe. The object of the invention is to provide for a great increase in the capacity of the watering-cart at the same time that its draft is reduced, these objects being attained by avoiding the ordinary wheeled frame upon which the water-tank is carried, and employing in its stead one or more axially rotating vessels which serve as their own wheels.

HOP-PICKER.—Raford W. Peterson and Samuel B. Clark, Santa Rosa. No. 426,603. Dated April 29, 1890. This is a machine for picking and separating hops from the vines. It consists essentially of sets of belts traveling parallel to each other, having transverse slats between which the vines are held, and cylinders or beaters rotating so as to pull the hops from the vines and drop them upon a carrying belt below; means for separating the hops from the leaves and for transporting them to a proper receptacle.

LUNG-TESTING TOY.—Samuel H. Pratt, Strawberry Valley, Yuba Co. No. 426,683. Dated April 29, 1890. This is one of that class of toys which are adapted to afford amusement by determining the power of the lungs of one who has knowledge of its operation, but wholly failing of result when in the hands of one who

may be ignorant of its construction, the object being to create temporary surprise at the failure and thus enhance its interest. The invention consists in a box or case having a wind-wheel within it and a registering dial on its exterior with hands for registering the revolutions of the wheel; an axially movable blow-tube let into the box or case and normally communicating with the wind-wheel, a concealed exhanst-port in said tube, normally closed, but adapted to be opened unperceptibly when the toy is handed to a person having no knowledge of it, and an exhanst compartment in the box or case into which the exhanst-port opens, whereby the air blown into the tube is misdirected.

The Mining Companies' Financial Standing.

The following is the financial standing on the first Monday of the present month of the mining companies listed on the two exchanges in this city:

	Cash.	Debt.
Alta.....	\$20,359	\$.....
Alpha.....	.....	\$1,574
Andes.....	4,436	.....
Bodie Con.....	113,605	.....
Benton Con.....	88,250	.....
Belcher.....	.....	\$4,089
Belle Isle.....	2,612	.....
Best & Belcher.....	1,332	.....
Bulwer.....	9,450	.....
Bullion.....	19,445	.....
Challenge Con.....	.....	9,701
Caledonia.....	6,781	.....
Chollar.....	120,654	.....
Con. Cal. & Virginia.....	134,763	.....
Confidence.....	2,517	.....
Con. Imperial.....	.....	19,925
Con. New York.....	3,573	.....
Commonwealth.....	11,926	.....
Crocker.....	2,396	.....
Crown Point.....	.....	15,698
Del Monte.....	.....	15,870
East Sierra Nevada.....	5,600	.....
Eureka.....	16	.....
Exchequer.....	12,456	.....
Gould & Curry.....	.....	\$2,283
Grand Prize.....	.....	19,634
Hale & Norcross.....	.....	\$41,760
Holmes.....	6,626	.....
Independence.....	1,737	.....
Julia.....	7,207	.....
Justice.....	7,226	.....
Kentuck.....	.....	629
Lady Washington.....	16,763	.....
Locomotive.....	856	.....
North Belle Isle.....	.....	\$20,852
North Commo. wealth.....	.....	\$20,737
Mexican.....	4,331	.....
Mono.....	10,379	.....
Nario.....	.....	13,692
Nevada Queen.....	.....	13,724
Occidental.....	.....	\$2,726
Ophir.....	.....	\$8,658
Overman.....	123,940	.....
Peer.....	3,655	.....
Peerless.....	.....	649
Potosi.....	23,576	.....
Savage.....	1,224	.....
Scorpion.....	6,573	.....
Seg. Belcher & Mides.....	.....	\$9,019
Silver Hill.....	2,364	.....
Sierra Nevada.....	3,162	.....
Silver King.....	2,222	.....
Standard.....	.....	7,129
St. Louis.....	358	.....
Syndicate.....	4,650	.....
Union Con.....	.....	\$3,524
Utah.....	17,373	.....
Welton.....	1,470	.....

*Collecting assessment.
†Mine expenses not included.
‡Mine expenses and full bullion return not included.
\$Collecting assessment, April bullion to come in and mine expenses to come out.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

LA ESTRELLA & MINERVA M. CO., April 21. Location, Rosario, Mexico. Capital stock, \$10,000.00. Directors—A. S. Barney, A. H. and Thos. F. Fish, David Hunter and H. B. Havens.

CALIFORNIA ELECTRIC TRANSIT CO., April 22. Capital stock, \$1,000,000. Directors—M. Livingston, A. Lefont, G. M. Asbe, Otto Belau and John M. Patterson.

HATHAWAY G. M. CO., April 26. Capital stock, \$400,000. Directors—T. B. Valentine, S. D. Valentine, J. S. Finch, C. H. Lindley and J. B. Hughes.

PEOPLE'S HOME SAVINGS BANK, April 26. (Amended articles.) Capital stock, \$1,000,000. Directors—F. A. Waterhouse, Isaac Upham, J. K. Wilson, Geo. Tait and Geo. D. Fry.

WEST COAST DEVELOPMENT CO., April 26. Object, bandling real and personal property, both as principals and brokers. Capital stock, \$100,000. Directors—M. K. Zanden, Arthur Bull, W. W. Hollister, Chas. Montgomery and Chas. G. Clinch.

LINCOLN M. AND MANUFACTURING CO., April 29. Object, to mine for coal, fire clay and glass-sand in Placer county. Capital stock, \$1,000,000. Directors—A. J. Angell, O. Arnold, A. H. Gales, A. Barron and J. R. Kelly.

AUSTIN.—The Virginia *Enterprise* says there are now employed in Austin but twelve men on day's pay, and there are not many more employed as tributers. A Chicago company has a bond on the principal mines of the district, which will fall due in July, when it is hoped they will pay up and resume operations. The resumption of mining operations in Austin means the expenditure of a considerable outlay of money, but the conditions would seem to justify it. The mines have been worked to the water level, and they have paid their way and handsome dividends over and above the cost of operations. It is therefore most reasonable to presume that with much better means for the handling, extraction and reduction of ores, and cheaper material, they can be made to pay below the water level, over and above the expense of pumping the water.

MECHANICAL PROGRESS.

The Difference Between Siemens-Martin Steel and Siemens Steel.

It is a common mistake, even among those who should be familiar with such matters, to confound Siemens-Martin steel with Siemens steel pure and simple. The two steels are manufactured by essentially different processes, the former by the Martin process in a Siemens regenerative furnace, hence the compound name, and the latter by the Siemens process proper.

Mr. F. J. K. Canella, a steel works manager of Wales, makes the following clear distinction: "In the earlier or Siemens-Martin process, malleable iron, wrought scrap, or scrap steel is melted in a bath of pig iron, from which the impurities are eliminated solely by the action of the flame and the addition of spiegel or ferromanganese. Wrought metal or scrap is an essential element of the process, and no ore is used. In the Siemens process, on the other hand, a much larger relative quantity of pig iron is employed, and although scrap is also generally worked up, the process can very well go on without it. Then, again, the impurities are driven out from the pig iron by the addition to the bath of a properly-selected iron ore, which becomes reduced while its oxygen carries away the carbon and assists in the formation of a silicious slag. Both processes require Mushet's addition of ferro-manganese at the end, a common need for most steel-making processes. It will require very little further explanation to show that the Siemens process lends itself more readily than the Siemens-Martin to the production of large quantities of a high-class material of uniform nature, as pig iron and iron ore of the necessary quality are always available in any required amounts, whereas wrought iron scrap and scrap steel are very difficult to procure in quantity and of the requisite quality."

THE FUSING POINT OF BLAST FURNACE SLAGS.—The Journal of the Society of Chemical Industry says that the results of some experiments on the fusing points of blast furnace slags recently made by P. Gredt, of Germany, are of much importance for both the iron and pottery industries. For the economical working of a blast furnace, the melting point of the slags which are formed is of consequence, as these ought to melt in the furnace at the same temperature as the iron. If they melt at a lower temperature they will combine with some of the iron, and if at a higher temperature a waste of fuel takes place. The formation of a suitable slag must therefore be carefully regulated by the addition of various gangues and fluxes in definite proportions. The slags obtained from a blast furnace in good working order consist almost entirely of silica, alumina, lime and magnesia, together with small quantities of alkalis and iron. The author obtained the requisite materials as pure as possible, and made them up with pure dextrin into tetrahedra resembling Seger's cones. Two series of slags were prepared in this manner: In Series I the amount of silica was kept constant and the proportions of lime and alumina varied from no lime to no alumina, while in Series II the cone with the lowest melting point in Series I—No. 11—was taken as the basis, and the lime in it gradually replaced by magnesia. In this manner the temperature of formation of slags containing silica, lime, magnesia, and alumina in every proportion was ascertained. From such experimental data a slag can be compounded to melt at any desired temperature.

MALLEABLE BRONZE.—A patent has been taken out, both in England and France, says the Boston Journal of Commerce, by A. Sauter, C. Marechal and A. Sauter, establishing a process for producing malleable and ductile bronze bars or plates, which are free from cracks and blowholes, are "inoxidizable," and which may be "rolled and drawn with the greatest ease." Moreover, the metal has the appearance and "sonorosity of gold." One and a half kilos of tin are purified by melting under niter. Ten kilos of copper are melted, and 50 grammes of equal parts of nitrate and cyanide of potassium are added, for the double purpose of reducing the oxide and "fattening" the metal. Then 25 grammes of bitartrate of potassium, with the same quantity of cyanide, are added, and after pelling, the tin is introduced; 25 grammes each of sal-ammoniac and cyanide are thrown on, one gramme of "phosphuret of copper" introduced to "impart mildness," and 20 grammes of "Marseilles soap" added, which still further "fattens" the metal. Finally, one gramme of sodium is added at the moment of casting.

WOVEN WIRE BELTS.—Machine belts made of woven steel wire are now being manufactured. Belts so made can be readily lengthened or shortened, and the joint cannot be distinguished from the rest of the belt. They are very strong, run very smoothly, and are claimed to be specially adapted for driving fast-running machinery.

A NEW MECHANICAL INSTRUMENT has been devised by a French inventor, which is said to indicate with marvelous accuracy the exact spot where interior flaws in iron and steel are concealed, the proof being obtained by fracturing the rails to see whether the invention had really discovered the presence of defects not outwardly visible. Very satisfactory experi-

ments were recently made with the instrument at the Erment Works of the French Northern Railway. This instrument will be of special value in testing the soundness of rails for railroad tracks, for the reason that a large proportion of railroad accidents occur from rails which break from such hidden causes as it is claimed this device will detect. The instrument is both mechanical and electrical in character.

THE MEASUREMENT OF DRAWN WIRES.—The determination of the thickness of metal in all forms is so delicate an operation that it is no wonder there are constant disputes over the gauges. Interest must therefore be attached to the new apparatus for measurement which Mr. W. H. Johnson exhibited at the last meeting of the Manchester, Eng., Philosophical Society. The inventor said it could measure thicknesses from 1-10,000 inch to three-fourths inch. In the paper which Mr. Johnson read he pointed out that workers in metal must from a very early time have required much more accurate means of measurement than other artisans. Wire-drawing is a very old industry, and it is remarkable that in Africa Livingstone saw wire drawn by a method the same in principle as the most modern methods, with the exception that machinery is used in the latter. Mr. Johnson said his new gauge is an adaptation of the micrometer screw, which for certain practical purposes he considered handier than Sir Joseph Whitworth's. —*English paper.*

NEW INVENTION IN GLASS INDUSTRY.—An invention has been perfected in the glass industry which, it is stated, will accomplish a complete revolution in that branch of manufacture. Until the present it has only been possible to produce sheet glass by blowing a hollow cylinder, which was then cut off, separated and polished. An American manufacturer has now succeeded in producing glass plates of great breadth and of any desired length, by means of rolling. Glass thus produced is said to possess a far greater homogeneity, firmness and transparency, and it has, on the upper surface, a brilliancy which is hardly to be distinguished from art plate glass. The material part of the invention consists in the application of the peculiar, undulated, hollow metal rollers, heated from the inside by means of steam or gas. The rollers seize the sticky, liquid glass which is conducted to them from the bottom of a melting-tub, without the intervention of any other apparatus whatever.

SEWING MACHINES IN GERMANY.—The Germans are making special exertions to extend the market for their iron and machinery products in the trade centers of the world. They are now sending some 200,000 sewing machines annually to South America. One of the largest German manufacturers of these machines which turns out about 30,000 a year, purposes to establish a large warehouse in Chicago, when he expects to undersell American machines, looking chiefly for customers among his countrymen who have settled in this country. The tariff men in Congress should see to it that our own mechanics are properly protected in this direction.

IMPROVEMENTS IN SOLDERING.—A soldering apparatus recently patented is made with metal discs for holding the work, and heating burners attached. A treadle apparatus is provided, which actuates vertically moving soldering irons, raising and lowering the soldering irons above the disc. By this apparatus it is claimed one man can solder a large number of tin cans in a comparatively short time. A soldering iron has been invented by a German which contains a chamber into which and from which fluid solder may be drawn and forced by pneumatic action.

BAD POLICY.—An English exchange says: "A contract for \$400,000 worth of steel rails has been given by the Government to a foreign firm. Of this sum upward of \$250,000 means wages, which are to be earned by foreign workmen, while English workmen are starving. All the postal cards used in England are made abroad." English mechanics and others in England are becoming alarmed at the large amount of money which is going out of that country to support the working people of other lands.

THE IRON TRADE.—It is stated that the extent of railroad track now in process of construction in this country or in actual early contemplation, will call for no less than 2,000,000 tons of rails. This means an immense increase of business, not only in the manufacture of iron, but in every branch of industry connected with the equipment and running of new roads, increase of commercial activity, etc.

IRON FOUNDRIES IN MEXICO are said to be growing quite numerous, and the work produced is described as satisfactory on the whole. There are some machinery establishments, chiefly worked by turbines, but these yield poor results, and practically cannot compete with imported machinery. Other iron goods are not made to any extent in the country.

THE MECHANICAL AND ELECTRICAL UNIT.—A horse-power in machinery means the raising of 550 pounds a foot a second; but the practical unit of power in electrical science is the watt, which is equal to one seven hundred and forty-sixth of a horse-power. It is so called in honor of Watt, who first defined the measurement of horse-power.

SCIENTIFIC PROGRESS.

Difference Between Coke and Charcoal.

Dr. W. Thoenner, in an article published in *Stahl und Eisen*, gives the result of a series of experiments designed to bring out the comparative characters of coke and charcoal. He points out that charcoal consists of a large number of more or less regularly arranged cells, joined to one another longitudinally. The walls of the cells are easily permeable by gases, and readily oxidizable. Coke, on the contrary, contains generally separate unconnected cells or groups of cells, the walls of which are composed of dense vitreous substance which is impermeable by gases and exceeding difficult to oxidize. Coke acts differently from charcoal in the furnace, and less advantageously because of these differences. If, therefore, it were possible to cause the structure and character of coke to more nearly resemble charcoal, either by rendering it more porous without sacrificing strength or by making it more easily oxidizable, the coke would be greatly improved.

Dr. Thoenner gives the results of several analyses, from which it seems that ordinary gas coke possesses lower real and apparent specific gravity than even coke, and shows more cell space in its substance. Wood charcoal possesses three times the purity of coke, with much lower specific gravity and sometimes double the cell space. Pine charcoal, the most porous of all, possesses the densest charcoal substance. In charcoal, the smallest details of the original structure of the wood are preserved; the arrangement of the cells being such that the gaseous products of carbonization can easily escape without rupturing the substance. Consequently, when the charcoal is burnt, the entrance and circulation of oxygen in the cells is equally easy. The charcoal substance does not pass through a stage of fusion in the carbonizing process; whereas in coke the substance has been fused into a dense, impenetrable, vitreous mass, through which, in consequence of the want of continuity between the cells, the oxygen can only slowly penetrate.

The March of Scientific Discovery.

Mr. John Cox, M. A., on Monday evening delivered, at the Gresham College, a lecture, introductory to a course, on "The March of Scientific Discovery." He said that, although the importance of scientific discovery was recognized, it was questionable whether the influence which it exerted upon modern life was fully appreciated. He referred to the great advantages which had taken place during the present century, particularly mentioning steam and electric power, the latter being, he thought, still in its infancy. By the aid of science all quarters of the globe had been brought in daily communication, and in every department of industry, where mere brute force was required, the labor was being taken from the shoulders of men and placed upon machinery, and great scientific discoveries necessarily brought about great social changes.

In the course of the lectures which he would deliver, his endeavor would be to draw particular attention to the intimate connection which existed between the different branches of science. The simple laws of motion stood at the beginning of the study, and when they were thoroughly understood, they would be able to understand the conservation of energy and the connection which existed between the different branches of science in relation to the methods by which discoveries had been made. From the time of the Greek philosophers, until 200 or 300 years ago, hardly any progress was made, but that which had been made since was very great, and it seemed likely to go on, because people had learned to rely upon facts rather than upon arguments and theories. In conclusion, he said that his object was not to give any description of the latest modern discoveries, but rather to accept the march of science as a whole from the earliest principle up to the present time, keeping in view the close connection between the different branches, and by means of illustration to show the method by which it had moved forward. —*London Iron and Steel Trades Journal.*

THE NORTH POLE.—Dr. Nansen is now to make an effort to discover the north pole. His hopes are founded upon the theory that there is a warm ocean current from the north coast of Siberia sweeping across the ocean from that point to and down the east coast of Greenland. The north pole, he believes, is in the direct track of that current. He is convinced that this theory is true from the fact that some portions of the cargo of the ill-fated Jeannette were found some two years after her wreck near the southern point of Greenland. He is confident that if he can place a vessel in that current, which must be warm and in an open sea, he can reach the pole without any serious obstruction from ice. This was evidently the theory and intent of the lamented De Long. The day before the Jeannette left San Francisco harbor the writer of this paragraph had a long and confidential interview with one of the members of the scientific party on board the Jeannette, who told us that the first we should hear of the ship would probably be from off the east coast of Greenland; that they expected by sailing in a north-

west direction, after passing through Behring straits, to reach a northeasterly warm current which would take them directly to the east coast of Greenland. That the Jeannettes actually reached the border of such a current is evidenced by the fact that the floating materials from the wreck above alluded to could not have reached the place where they were seen upon any other hypothesis.

ELECTRIC CURRENTS IN THE SKIN.—An interesting study has been lately made by Herr Tarchenoff of electric currents in the skin from mental excitation. Unpolarizable clay electrodes, connected with a delicate galvanometer, were applied to various parts—hands, fingers, feet, toes, nose, ear and back, and after compensation of any currents which occurred during rest, the effects of mental stimulation were noted. Light tickling with a brush causes, after a few seconds' period of latency, a gradually increasing strong deflection. Hot water has a like effect; cold, or the pain from a needle-prick, a less. Sound, light, taste and smell stimuli act similarly. If the eyes have been closed some time, mere opening of them causes a considerable deflection from the skin of the hand. It is remarkable that these skin currents also arise when the sensations are merely imagined. Mental effort produces currents varying with its amount. If a person is in tense expectation, the galvanometer mirror makes irregular oscillations. In all the experiments it appeared that, with equal nerve excitation, the strength of the skin-currents depended on the degree to which the part of the skin bearing the electrodes was furnished with sweat-glands. —*Electrician.*

THE COLORS OF A SUNBEAM.—We speak of the sun's light as colorless, says the author of "The Story of the Heavens," just as we speak of water as tasteless, but both of these expressions relate rather to our own feelings than to anything really characteristic of water or of sunlight. We regard the sunlight as colorless because it forms, as it were, the background on which all colors are depicted. The fact is, that white is so far from being colorless that it contains every hue known to us blended together in certain proportions. The sun's light is really extremely composite. Nature herself tells us this, if we will but give her the slightest attention. Whence come the beautiful hues with which we are all familiar? Look at the lovely tints of a garden; the red of the rose is not in the rose itself. All the rose does is to grasp the sunbeams which fall upon it, extract from these beams the red which is in them, and radiate that red light into your eyes. Were there not red rays commingled with the other rays in the sunbeam, there could be no red rose to be seen by sunlight.

THE SPIRIT OF THE AOE.—There is no such thing in this day and generation, aptly says the *Medical Visitor*, as "making haste slowly." If the Chicago business man could be shot through a pneumatic tube into New York City in the space of a few minutes, the limited express train taking 24 hours to reach there would no longer be patronized; and if the New Yorker could land in Liverpool in less than two days via an air line, the ocean greyhounds would find their day of usefulness had fled. No one has time to build Egyptian pyramids nowadays; indeed, with every facility to visit the land of the Pharaohs, few of us have time even to stop and look at such works of art. Speed is the necessity of necessities in our time, and if lightning speed can be obtained, nothing but lightning speed will be tolerated. This rule applies equally to firing a gun, making money, or the development of science. This century has already passed through the phases of a cotton age and an iron age, and is rapidly being transformed into an electrical age.

A NEW WEATHER INDICATOR.—In experiments repeated thousands of times since 1850, M. Palmieri, director of the observatory of Vesuvius, has shown that the electricity of the earth's surface is different from that of objects above it. The electricity of the earth is usually positive, that of the air being negative in fair weather, and positive only when rain, hail or snow fall within a certain distance. The electricity of the air is due to induction, and is maintained while the inductive influence is steady, changing as it changes. Observations of the electrical condition of the atmosphere seem to give a certain indication of weather changes, while the barometer fails in some 20 per cent of cases. M. Palmieri urges a systematic testing of a standard electrometer as a weather-predicting instrument at a sufficient number of stations.

A CURIOUS ILLUSTRATION of the theory of transient currents is that given in the *Electrical World*. A steel bar fell across the terminals of a dynamo, and the immediate result was a violent surface heating that was dissipated almost in a moment when the current ceased. It was not the ordinary heating of a conductor, but a true surface phenomenon. Such an accident is a beautiful exhibition of electrical theory, and fortunately its details fell into the hands of Sir William Thomson, who promptly investigated it. It is sometimes little things of this sort that lead to the most important results, as in the historical case when the almost invisible twitch of a galvanometer needle as the circuit was broken led Faraday to the discovery of induction.

GOOD HEALTH.

ACTION OF ELECTRICITY ON THE HUMAN BODY.—Just what takes place in the human organism to produce death from an electric current seems to be an unsolved problem, writes John C. Henry in the *Electrical World*. I have had a theory in regard to this subject so long that I have forgotten whether it is original or not. It is, that when a being suffers death from an electric shock, it is a pure case of internal rupture or explosion from the generation of gas or vapor. In support of this view I would refer to the many cases in which telegraph poles are torn to pieces. My observation on the plains, where it is a very frequent occurrence, is that the lightning follows the moist portion of the pole, which is the core or heart; in this case the moisture is vaporized and an explosion occurs. The high resistance produces heat, the heat in turn, steam, and the steam an explosion. It has been suggested that death is caused by a magnetic or electrolytic effect. I know of no experiment that would demonstrate either of them, or heat, to be of any more force from an alternate than from a direct current, and yet our sages say the alternate current is the more dangerous. If this is true, we should grope around in the dark to find the other effect that may be used in the service of man.

ENLARGING THE CHEST.—Singers with no other exercise but singing acquire great respiratory power and a remarkable increase in the dimensions of their chests. Numerous observations prove that it is enough to take voluntarily a certain number of deep breaths every day to produce in a short time an increase in the circumference of the chest. If we wish to gain the same result from muscular exercise, we must choose a form of work which will increase the intensity of the respiratory effort—that is, an exercise which brings powerful muscular masses into action. We shall thus perform a great quantity of work in a short time without producing fatigue. Now the legs, which possess three times as much muscle as the arms, can perform thrice the quantity of work before being fatigued. The lower limbs are, then, more capable than the arms of awakening the respiratory need, which is proportional to the expenditure of force. Thus it is an error to demand from gymnastic exercises practiced with appliances, exercises of suspension or support, any development of the chest. The trapeze, the rings, the parallel bars, quicken respiration much less than running.—*Popular Science Monthly*.

INDOOR AND OUTDOOR LIGHT.—Most persons would say that the outside light is two or three times as strong as that within our houses. But the ratio of difference is vastly greater. Carefully prepared tables, according to *Health*, show that for a view at the seashore, comprising sea and sky mainly (with a lens and plate of a certain speed), an exposure of one-tenth of a second is sufficient. An open landscape away from the sea would, with the same lens, the same aperture, and the same plate, require one-third of a second. A fairly lighted interior would require 2½ minutes, while a badly lighted interior, such as rooms which most ladies prefer to occupy, would require half an hour to obtain an equally good picture. In other words, patients strolling on the seashore in sunny weather are in a light not two or three times but 18,000 times stronger than that in the ordinary shaded and curtained rooms of a town house; and the same patients walking along the sunny side of a street are receiving more than 5000 times as much of the health giving influence of light as they would receive indoors in the usually heavily curtained rooms.

EFFECT OF COFFEE ON MICROBES.—According to the *Lancet*, Dr. Luderitz has recently made a number of observations on the destructive power of coffee upon various microbes. He found that the organisms all died in a longer or shorter period. In one series of experiments, anthrax bacilli were destroyed in three hours, anthrax spores in four weeks, cholera bacilli in four hours, and the streptococci of erysipelas in one day. Good and bad coffee produce precisely similar effects.

SLEEPLESSNESS.—A writer in an exchange says he has discovered a remedy for sleeplessness, which he has never known to fail, which convinces him that the whole trouble arises from overstrain of the eyes. Take a small cloth—say a piece of napped towel—and fold it in two small pieces of ice at a proper distance apart to exactly cover the eyes when the cloth is laid across them. Then lie down, adjust the cloth with the ice over the closed eyes, and you will be asleep in a very short while.

KEROSENE as a therapeutic agent is highly spoken of by Dr. H. A. Gross in the *Medical World*. It cures almost all pains, from toothache to gout and rheumatism. It is deodorized in this manner: Take of coal oil, 1 pint; nitric acid, 1 ounce. Mix. Let stand for a week and pour off the supernatant oil. It does not in the least smell like coal oil.

POISONOUS LEAVES.—Never touch a vine that has three fingered leaves—that is, leaves divided into three parts. Vines that show five-fingered leaves may be banded with safety. Poison ivy has three fingers.

USEFUL INFORMATION.

TO COUNT THE REVOLUTIONS OF A SHAFT.—Several rough and ready methods of ascertaining the number of revolutions of a shaft are known to engineers, but the following one suggested in the *Manufacturer and Builder*, by M. C. Meigs of Washington, is so simple, ingenious, and, when carefully conducted, so accurate, that we are sure its reproduction here will interest our mechanical readers. A lead pencil is tied fast to the end of the shaft whose revolutions are to be counted, in such a manner that it shall describe a circle of a convenient size for observation. If, now, a piece of paper be held lightly against the pencil, the motion of the pencil will describe a circle on it. If, however, the paper be moved backward and forward while the contact with the pencil is maintained, the pencil will describe a series of loops intersecting each other. By timing the period of contact, and then counting the number of loops recorded on the paper, the number of the revolutions of the shaft will be given with close approximation to the truth.

COMPOSITION OF COLORS.—To make flesh color, mix white, crimson and vermilion. Brown: red and black. Bright brown: carmine, yellow and black. Rose: crimson, lake and white. Chestnut: white and brown. Cream: white, yellow and Venetian red. Purple: carmine and blue. Lead color: white and black. Silver gray: indigo and lampblack. Pearl gray: white, blue and black. Pearl: blue and lead color. Pink: white and carmine. Chocolate: black and Venetian red. French white: purple and white. Green: blue and yellow. Pea green: green and white. Bright green: green and white. Dark green: green and black. Orange: red and yellow. Straw color: white and yellow. Olive: red, blue, black and yellow. Buff: yellow, white and red. Vermilion: carmine and yellow. Livender: carmine; ultramarine and white. Sky blue: white and ultramarine. Umber: white, yellow, red and black. Drab: amber, white and Venetian red. Use white to produce light tints, and black to produce dark tints.

CLEANING FILES BY ELECTRICITY.—An improved means for cleaning files, which is claimed to restore them to the condition of new files, is described as follows: After being cleaned and wetted, the file is dipped between two carbons into acidified water, and the circuit of an electric current is established between the carbons and the file by means of a piece of metal, serving as a support to the file, by which the latter is suspended. The water is then decomposed by the current, the oxygen acting upon the cuttings of the file, while the hydrogen bubbles settle in the teeth and protect them against the action of the acidified water. After immersion for a few minutes, the file is withdrawn and brushed in clear water to remove the oxide of iron, and then replaced in the bath. When the cuttings are entirely cleared, the file should be immersed in an alkaline bath to remove all traces of the acid, then dried and brushed.

MR. EIFFEL, who has got his name up so high with his Paris tower, has made a proposition in connection with Mr. Edison to erect a similar structure for the Chicago Exposition, and to remain there as a permanent structure, which shall be 500 feet higher than the Paris tower. It is proposed to place many thousand colored electric lights along the structure to render it one of the most beautiful and marvelous spectacles which the world has ever seen. If the plans they propose meet with the approval of the Exposition directors, Messrs. Edison and Eiffel intend to take upon themselves all the pecuniary responsibility of the work as a private speculation.

A NEW CLEANSING PRODUCT has recently been devised at Heidelberg, Germany, which is said to be of great value for cleansing, prior to bleaching, not only cotton but all kinds of vegetable fibers. The method of manufacture is kept secret. It is a gray powder, colorless, and partially soluble in water. An analysis made by Dr. Zirnitz shows it to contain 27 per cent of soluble matters, 21 per cent of which was carbonate of soda; 30.8 per cent consisted of silica and oxides of iron and alumina; there was 34 per cent of lime, with small quantities of sulphide of lime.

BRICK FROM SLATE.—Northern manufacturers are interested in the statement that the finest brick made in the South are from the refuse of slate quarries. They have a double resisting power and absorb only one-third as much water as ordinary brick.

WELDING MALLEABLE IRON.—You can weld malleable cast-iron plates by riveting them together and using a flux of powdered borax and Norwegian or crucible steel filings, equal parts. Let the first blows of your hammer be tender ones.

TO MAKE WATERPROOF WRITING INK, an ink which will not blur if the writing is exposed to rain: Dissolve two ounces shellac in one pint alcohol (95 per cent), filter through chalk, and mix with best lampblack.

A HUGE MASS OF COAL.—The men at the Roane Iron Company's mine, near Rockwood,

Tenn., found a mammoth piece, measuring probably ten feet square, though very irregular, and by skillful manipulation they got out a block six feet by four feet by three feet, weighing 2½ tons—without doubt the largest solid piece of coal ever taken out of a Southern mine. It was perfect in proportions and squared on all sides, but in moving a piece was knocked off a corner that marred the symmetry of the whole.

ELECTRICITY.

Storage Batteries and Their Use.

A few months ago, comparatively speaking, the electrical scientists were interested only in the action of the secondary or storage battery. Some prophecies were made as to what it might be in the practical world, but these prophecies were merely looked upon as the enthusiastic expression of dreamers. To-day the country is full of storage batteries of many makes, and the Patent Office reports new inventions and improvements every week. To-day a storage battery is useful in many ways, and is almost a necessity in some cases.

As the storage battery, or, as it may more properly be called, the accumulator, stands to-day, its usefulness for work depends upon partially known laws of chemistry and common-sense laws of mechanism. The chemical laws taken advantage of by the maker of any accumulator are invariably the same.

The method of building a battery so as to make use of the chemical action to the greatest advantage, varies greatly in different batteries; but it is now pretty well ascertained that the electromotive force to be gotten out of a charged battery is, for the moment, about the same in all varieties, and that this force, when obtained, will do a certain amount of work. Quite an accurate estimate can be obtained as to what can be done in certain conditions. But the difficulty is that although batteries are chemically all alike, one battery may be more efficient than another for a short time, owing to its peculiar mechanical construction. "The less the internal resistance," says the *Electrical World*, "the greater percentage of delivered work, i. e., low resistance to a certain point. Too low internal resistance would prevent a battery from holding a charge for any length of time, if left unused. Make the battery so that the efficiency of the work being known and calculated upon, this efficiency can be counted upon always for such a length of time of use, which would make such batteries an economical purchase. Possibly, to do this might necessitate a form of manufacture or building which might show a slight increase of resistance, but which would, by its constant work, sustain the first estimate made upon it under all situations of rough work or sudden change of temperature, for such a length of time, in years, as would make the plant profitable. Such a battery built for use for constant work, under any circumstances, which will give out many times more current at once, if called for, than the normal demand might be, without any detriment to its stability, is now upon the market, and street-car traction men would do well to try it.

"All of a year's trial is necessary, in many ways of practical work, to tell what a storage battery will do under all circumstances, and how well it will stand the work without material deterioration. Laboratory tests determine very little in such cases."

Storage Battery Traction

Has come to stay, and in many places, especially abroad, it is the only way of utilizing electricity for city traffic. The reports from London have been of a much more encouraging character, and it is probably only a question of time when the present difficulties will in large measure disappear. The experiments in New York have met with considerable success, and the indications are that the storage battery car will soon become an important part of the regular rapid transit system in that city. In some way or other the horse must go, and the great first cost of cables goes far to offset the lower efficiency of the storage system.

In London, some interesting experimental trials have recently been made on the Southwark Subway with the electric locomotive, by which the trains on this new underground line are to be worked, and highly satisfactory results have been obtained. With a train of three carriages, carrying 100 persons—a speed of 20 miles an hour was obtained, and the locomotive alone ran at a speed of 30 miles an hour.

In Chicago, a syndicate of Chicago capitalists have bought the Woodward storage battery, which had propelled a street-car satisfactorily for a week, for \$300,000. Manufacturing works will be established near that city. It will probably be the solution of the street-motor question.

THE FASTEST TIME made by an electric railway is, according to the *Age of Steel*, a mile a minute by a small experimental car. On a street railway system 20 miles an hour is the fastest. The prediction is made by a writer in *Scribner's Magazine* for April, that within ten years there will not be a horse railroad in any prominent city in the country. The number of electric railways now operating and in course of construction in the United States is estimated at 179, representing 1260 miles of track.

ENGINEERING NOTES.

THE UTILIZATION OF THE TIDES.—That the enormous unused tide-power along the various city fronts of the country will soon be set to actual and economic work, goes without saying. Many inventors are at work upon this problem. Quite recently several patents have been allowed to Mr. H. B. Rankin of Boston for a "tide motor," and a company has been formed in that city to construct a plant which will make it possible, it is asserted, for the public to be supplied with motor-power for all mechanical uses at 75 per cent less than the cheapest method in the market. This motor, or a series of them, can, it is claimed, be placed upon our marginal tide-waters and easily furnish sufficient power to light the city with electricity, run the surface cars, and turn the machinery of every mechanical plant in Boston. The tide in the harbor, which rises to the height of 10 feet, and lowers 10 feet, or which moves nearly 40 feet during 24 hours, is to be utilized by tide-water motors. The Rankin tide motor consists of a float which is anchored by cables. These cables are wound around shafts which project from the sides of the float. The upper and lower ends of the cable are made fast, and of equal length. The float is sunken until it draws, say four feet of water, that is, two feet more than it allowed to float without anchorage. Being thus under restraint, any movement of the float, up or down, will cause a revolution of the shaft to which the cable is attached. This motion, increased by a series of gears and pulleys, and concentrated upon a central shaft, fitted with a series of speed wheels, will be the power need to drive the dynamos.

COMBINED WATER AND RAIL TRANSPORTATION.—A singular combination of water and rail transportation is proposed by the board of government engineers that has been investigating the obstructions to navigation in the Columbia river, South America, between the Dalls and Celilo. The board recommends the construction of a double track, standard gauge, railway along the falls and rapids a distance of eight miles, upon which steamboats shall be carried, being raised by means of hydraulic lifts, the lower of which will raise the boat 68 feet at low water and the upper will lift 40 feet. The car on which the boats are to be carried is to be 168 feet long by 33 wide, having 34 four-wheeled trucks placed in two lines of 17 each. The weight of the car is to be 300 tons and the weight of maximum load 600 tons, making the total weight of loaded car 900 tons, which is equivalent to the weight of 30 good-sized locomotives or as many heavily loaded freight cars of ordinary size. The estimated cost of this marine railway with equipment of two cars and four engines, including necessary buildings, is \$2,690,000, and to increase the capacity of road, equipment, etc., to a maximum of 40 boats will, it is estimated, make the total cost about \$3,576,000.

A SUBMARINE BOAT.—Some remarkable things have been told of the Spanish submarine torpedo boat, the Peral, and these seem to be confirmed if correct reports are given of tests recently made at Cadiz. From these accounts it appears that the speed of the boat when running on the surface was about eight knots an hour, while under water she ran between five and six knots an hour. The boat was navigated for over three hours with all connection with the outer air completely shut off, and for more than two hours in fighting trim, with only four inches of the observation turret above water. One continuous trip of 40 minutes was made with the boat entirely under the water, during which time she traveled about four miles. The machinery is said to have worked without the slightest trouble, and during the submarine trips the crew did not experience any inconvenience whatever.—*Engineering Journal*.

THE NICARAGUA CANAL.—The cost of the proposed Nicaragua canal is now placed at \$65,000,000. The distance between the oceans is 169 miles, but only 29 miles of canal will have to be dug. The San Juan river must be deepened and some artificial basins constructed in the valleys of other streams. Lake Nicaragua affords 56 miles of free sailgill. The Suez canal, which was cut out of the soil and sand for 100 miles, cost \$81,000,000. In order to facilitate work on the canal, a railroad is now in process of construction from tide-water, on the Atlantic, to the divide—a distance of about 30 miles, over which supplies and materials for construction will be transported, so that work can progress more rapidly at several points along the line.

ANOTHER SHORT CUT FOR SHIPPING.—A project is on foot to dig a ship canal from a point opposite Grand Island, in Lake Superior, to the northern extremity of Green bay in Lake Michigan, cutting across the narrowest part of the long peninsula between these two lakes. The proposed canal is to be 36 miles long and will save two days and a half for steamers and five days for sailing vessels that would otherwise have to go round the peninsula.

AROUND THE FALLS.—The proposed ship canal around Niagara Falls has been favorably reported upon by the Congressional House Committee on railroads and canals. The bill will appropriate one million to commence the work, which, it is estimated, will eventually cost twenty-three millions.



A. T. DEWEY.

W. B. EWER.

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Passing Events.

The molders' strike seems to be approaching an end, as more molders have arrived from the East to take the places of the strikers, and all the shops are now supplied except one. There have been some acts of violence during the past week, men having been beaten and ill-used when outside the shops, presumably by strikers or sympathizers.

The great cantilever bridge across the Colorado, having the longest span of any cantilever bridge in the world, was completed this week. The bridge is 960 feet long, with a span of 360 feet.

On Saturday last the statue of Marshall, the discoverer of gold in California, was unveiled at Coloma, with appropriate ceremonies.

The eight-hour system has gone into effect with the building trades of this and other large cities without disturbance of any kind. It is said now that the coal miners throughout the country are preparing to quit work. Steamboatmen and firemen, tanners and waiters are also considering the question.

There is nothing of special interest in the mining situation aside from what is mentioned in our "Mining Summary" on another page. The advance of spring has started up many mines, but there is still a large quantity of snow on the higher mountains.

The Yuba Mining and Smelting Co. have purchased most of the principal mines in the Bristol range, Lincoln Co., Nev.

The Silver Question in Congress.

The United States Senate has at last taken up the Jones Silver bill, and it now looks as if it will be pushed to a finish. At this writing it is hardly safe to predict in what shape the bill will be passed, but judging from the published expressed views of leading senators, it will be amended still further in favor of bimetalists, with free coinage as a certainty in the near future. It is quite certain that the hullion redemption clause in the Jones bill will be omitted or canceled, and that Treasury notes issued in payment of the monthly purchases of 4,500,000 ounces of silver, will be redeemable in lawful money. This will make the Treasury notes take precedence over every other kind of paper currency, and will give them a fixed value abroad.

There is no denying but the prejudice entertained in the Eastern States against silver is wearing away under the already favorably felt influence of the advance in the price of silver. The recent advance had a stimulating effect on nearly all kinds of industries by reviving confidence, and at the same time promoting a more speculative feeling in every kind of leading securities.

That the action of Congress on the silver question is closely watched abroad, is verified by the following press telegram from London:

Mr. Gibbs, ex-governor of the Bank of England and president of the Bimetallic League, called Senator Jones in the name of the Bimetallic League, "deeply regretting the death of Senator Beck, whose services in the cause of monetary reform are most warmly appreciated," and adding: "The Bimetallic party in the United Kingdom, now including over 100 members of the House of Commons, attaches the greatest value to the debate about to commence in your illustrious chamber. We fully recognize, not only that the support afforded silver by your legislation during the past 12 years has helped to protect the industrial world from acute monetary crisis, but also that the debates in Congress have served more than all else to educate our people to the recognition of the important issues involved. We believe, also, that the increased coinage of silver contemplated by Congress will restore, wholly or considerably, your coinage rates, and will thus make an international settlement of this complex question comparatively easy. We anticipate further, with much confidence, that the advance in the price of silver, which must follow your action, will stimulate the export trade of your country, and, while tending to the prosperity of your agricultural classes, will also assist the manufacturing industries of the United Kingdom and the whole body of our wage-earners."

Southern Nevada.

D. O. Mills is now in San Francisco and is considering the extension of the Carson & Colorado railroad southward from Owens lake. Surveys have been made for a 50-mile extension and are now in his possession for perusal. This road has benefited Esmeralda Co., Nevada, and Inyo Co., California, and its extension southward will have the effect of opening up other mineral regions along its line.

The counties of Lincoln, Nye and White Pine are isolated from railroad connection, and these, with Eureka and Esmeralda, form a large extent of mineral region much of which is yet vacant. Several good gold-veins have been discovered lately at Irish mountain, not far from Logan and Hiko, Lincoln Co., but this, like the whole region, lacks railroad facilities as yet. This will be remedied by the extension of the Utah Central beyond Pioche to a connection with the Atlantic & Pacific. Nye county has a great number of promising districts which will eventually come to the front, but at present it must be very rich ore indeed to pay. All through the section referred to are numbers of isolated mines, groups and districts that capital has neglected almost entirely, owing to the lack of transportation facilities. There is much unprospected and undeveloped land which is of little value until there are railroads within reasonable distance.

SMELTING WORKS CLOSED DOWN.—A special to the Chicago Times from Helena, Montana, says: The Helena & Livingston Smelting Co., located at East Helena, and the Great Falls smelter have closed down. The cause of suspension is difficult to get at, but from what can be learned the chief factor in closing down is the exorbitant freight rates on ore to this point as compared with the rates to Omaha and other Eastern smelting points.

Hydraulic Mining.

The Nevada Transcript is responsible for the following statement: "The hydraulic mines at Dutch Flat that empty their debris into the American river are running regularly, and they are not infringing any law in doing so. The Natoma Water Company's stone dam at Folsom is successfully impounding all the eluvions and nobody is being injured, while a great deal of gold is being added to the country's wealth and many men are given employment."

If it is a fact that these mines are running with the above result, it simply verifies the prediction made by the MINING AND SCIENTIFIC PRESS last December, that the dam in question would serve a purpose from an engineering point of view, having a decided bearing on the much-discussed debris question. Although not built for such a purpose, there is no doubt of its catching a large amount of debris. The small dams built by companies on side streams could give no such illustration of the possibility of impounding debris as the large dam built by the State on a main stream.

The Anti Debris Association has given out for publication an account of hydraulic mines in operation, being the substance of reports from the association's agents in the mountains. This statement says no hydraulic mining is going on at Dutch Flat, notwithstanding reports to that effect, but that there are two monitors at work at Gold Run. Three miles farther down there are two Chinese hydraulic mines in operation, and there are one or more at Iowa Hill. All these discharge into the American river.

The association is informed that there is no hydraulic mining on Bear river, and that the stream is clearer at Dutch Flat and above than for many years. On the South Yuba, at Columbia Hill and Union Hill, there is no hydraulic mining. At Union Hill a small hydraulic mine recently ceased operations to avoid suit. The North Bloomfield is using only one monitor, and its only water supply is from Humboldt creek, the main ditch being out of repair. The debris is going into the settling reservoir from the upper part of the mine. The North Bloomfield is the only hydraulic mine at work on the South Yuba. On the Middle Yuba, one hydraulic mine is reported in operation. On the North Yuba a small hydraulic mine is in operation at Oak Flat. A gang of Chinese is also working with a pipe a mile below Downieville. At Eureka North two hydraulic monitors are running. At Brandy City one monitor is in use in the Arnett mine and two in the Lawrence mine. Richards' mine, at Eureka North, is using one monitor. On the Feather river, in Plumas county, hydraulic mining is reported in a number of localities. A mine worked by the hydraulic process on Rattlesnake creek, Nevada county, ceased operations after notification from the association.

Dutiable Sodas.

EDITORS PRESS.—Kindly inform me at your earliest convenience what quantities of soda ash and other dutiable sodas—bicarbonate, etc.—were imported by California and the Pacific Coast in 1889; also what is the duty per ton upon soda in its various forms.

C. W. C.

Independence, Inyo Co.

[The following table shows the imports in pounds at San Francisco for the past three years:

	1887.	1888.	1889.
Caustic soda.....	2,650,743	3,924,288	2,303,826
Soda ash and sal-soda.....	3,393,328	6,260,169	4,195,158
Bicarbonate of soda.....	420,399	416,068	223,061

The duty on soda ash is one-fourth cent per pound and on bicarbonate of soda 1½ cents per pound. That on hyposulphite and all carbonates is 20 per cent. On hydrate or caustic soda the duty is one cent per pound; on sal or crystal soda, 20 per cent; and on silicate one-half cent per pound.—EDS. PRESS.]

CARBONATES.—A Great Falls, Mont., special says: Reports from Barker confirm the news of great finds of carbonates and galena in the May and Edna mines, and also in mines which have been christened the America and Columbus. The discoveries produced a profound sensation, and workmen on the Great Falls extension of the Great Northern Railway line, and miners from other sections, are staking out claims on the new treasure held.

THE Singer Sewing-Machine factory at Elizabeth, N. J., was almost entirely destroyed by fire on Tuesday night. The loss is about \$3,000,000.

The Mechanics' Fair.

At a meeting of the Mechanics' Institute it was decided to open the Twenty-fifth Industrial Exposition on Thursday, Sept. 18th, and to close Saturday, October 25th, in compliance with the request of the Society of Pioneers and the Native Sons of the Golden West, to whom the use of the exposition building on the 8th, 9th and 10th of September was granted for the purpose of celebrating the fortieth anniversary of the admission of the State of California.

A resolution introduced by Trustee George E. Dow was unanimously adopted, to the effect that at the forthcoming exhibition the whole of the Grove-street side of the Pavilion or as much thereof as may be necessary shall be devoted to the exhibition of electrical apparatus and appliances, and the Secretary was instructed to notify all agents and manufacturers of electrical apparatus to make early application for space. This is a good move. We have never had in this city anything like a good exhibit of electrical appliances. Of late years these have increased in number and design wonderfully and it will be a revelation to many to learn what a variety is now made. The Electrical Society of this city might greatly aid in this matter by getting manufacturers and agents interested.

It is greatly to be hoped that the manufacturers and dealers in California will interest themselves this year and bring out a good exhibit of our industrial resources. This fair is not a local one by any means, and all parts of the State should be represented. During its continuance it is visited by people from all the counties of California. Those who exhibit have an opportunity of showing what they make or sell to thousands daily. Here the products are seen in their most attractive form and can be examined carefully. Such an opportunity should not be missed and those who make early preparation and application for space will have the best advantages.

The Grand Canyon Discoveries.

There have been all sorts of more or less improbable stories of late about mineral discoveries in the Grand Canyon of the Colorado. Men are reported as having seen ledges along the wall of the canyon, and others have been panning out gold in the river-bed. A press report was recently sent out from Denver stating, on the authority of Col. R. B. Stanton, chief of the surveying party which went through the canyon last winter, that a great number of gold and silver ledges had been discovered. The editor of the Mohave Miner (Arizona) says Col. Stanton positively ascertained him that, with the exception of the already known placer mines, he knew of no other gold or silver indications in the entire canyon. The Miner quotes a letter from a prospector who has gone to the recent discoveries (?) which says: "We are here all right. They have a large heap of sulphurets which will go about 60 cents to the ton. There are about 20 men here. The majority of us will go back in a few days. Tell your friends to keep away from here."

So far, the richest rock found in the new strike north of Flagstaff assayed but 190 ounces in gold or silver, mostly the latter; but other samples sent to the Miner only assayed from 6 to 24 ounces in silver per ton. The ledge are large, but of low grade. There seems to be no reason to believe that the reports sent out can be relied on to the effect that mineral of great value can be found anywhere a pick is struck. It will take further developments to prove whether the district is a good one or another Harqua Hala.

DODGE MILLS.—S. L. Burbridge, superintendent of the Grand Prize mine, Payson, Gila county, Arizona, writes to Mr. Dodge, care of Parke & Lacy Co., as follows: "The little mill is running very smoothly and working from 10 to 12 tons of very hard ore, through a No. 40 screen, per 24 hours, and I consider that it is a closer amalgamator than either a stamp-mill or an arastra. I believe when ordinary intelligence is used in running your mills, that they will do all if not more than you claim for them."

THE Virginia Enterprise says that as to the milling outlook it has never been better since mills were erected on the Carson river. The indications are that the water will hold out nearly all summer.

The Marshall Monument.

On Saturday, May 31, the statue of James W. Marshall, the discoverer of gold in California, was unveiled at Coloma, El Dorado county, near the spot where the first gold was found. The Legislature provided the funds for this monument, which was designed by F. Marion Wells, the accomplished sculptor, who has executed his task with skill. The statue represents Marshall in the dress of the period. He is facing the river. In his right hand he holds a golden nugget, while with his left index finger extended he points to the exact spot where the ever-memorable discovery was made. The statue is grand in proportions and workmanship, and the design is quite historical.

The monument is now completed, and stands 39 feet 6 inches in height, and is of admirable proportions. The cap of the pedestal is five feet square, on which the statue of Marshall is placed. The statue is heroic in size, being 9½ feet in height, representing Marshall dressed in miner's garb. On the north side of the monument is the inscription of the Great Seal of the State; on the south side, a view of Sutter's mill; on the east side, the names of the Commissioners, A. Caminetti, John H. Miller, George Hofmeister and H. C. Geesford, with a legend reading: "The site for this monument is a gift to the State of California from Placerville Parlor, Native Sons of the Golden West."

On the west side of the monument are the words: "Erected by the State of California, in memory of James W. Marshall, the discoverer of gold. Born Oct. 10, 1810. Died Aug. 10, 1888. The first nugget was found in the race of Sutter's mill, in Coloma, Jan. 19, 1848."

On this page is a photo-facsimile of the entire monument. We have before this given several sketches of the life of Marshall and an account of his famous discovery, so that it is unnecessary to repeat this at this time.

On the occasion of the unveiling of the statue on Saturday last there were many distinguished men present. Senator Caminetti, of the Commissioners, delivered the monument to Governor Waterman as the representative of the State. The Governor made a brief speech, and Mrs. J. I. Reed of Placerville read a poem in enology of the discoverer of gold. Senator A. F. Jones of Oroville was the orator of the day and delivered an eloquent oration. P. S. Lawson, President of the Sacramento Pioneers, also spoke, as did several others. The Native Sons of the Golden West and the Sacramento Society of California Pioneers were in charge of the ceremonies.

MINES AND PROSPECTS.—The stocks listed at the Colorado Mining Exchange at Denver are divided into two classes, one being "mines" and the other "prospects." Under the head of "mines" are stocks representing productive properties, which are paying dividends, and under that of "prospects" are mining claims in which good bodies of ore have yet to be found. When a reporter suggested to a local broker that this would be a good example for the San Francisco Stock and Exchange Board to copy, he replied: "It isn't healthy for our business to let the public know too much about these matters. If the list were thus to be classified, nine-tenths of the stocks would go under the head of 'prospects,' and that wouldn't make a good showing."

A CENTRIFUGAL CONCENTRATOR is to be put in at the Boston Smelting Works, Butte, Mont., where, according to the *Helena Independent*, the system of treating gold-bearing pyrites has been most successful. A small amount of fluxing material is mixed with the ore, and by means of a hot blast the sulphur contained in the ore is made to create a heat sufficient to smelt the whole mass and make it run like water. By combining these two processes together, the centrifugal concentrator and the hot-blast treatment, a saving of at least one-fourth can be made over the old manner of treatment.

THE JACKSON CREEK copper mines, which were abandoned a year ago, have been relocated by miners from Cedar district. These mines are situated about 45 miles northwest from Winnemucca, Nev.

An oil well was struck recently in Torrey Canyon, Ventura Co. that flows 200 barrels a day.

The Molders' Strike.

It looks at present as if the molders' strike in this city would soon come to an end. Several more men were brought from the East this week and have gone to work in the shops in place of the strikers. The Pacific Iron Works, one of the large foundries, has again started up with a quota of men on the molding-floor. In fact there is now only one institution which remains closed—that of Byron Jackson—and other foundries are doing his work for him. The manufacturers profess themselves pleased with the state of affairs, and consider that they have overcome the worst obstacles. Although not full-handed in the molding-room, they have competent bands enough to get along with. There have been some disorderly proceedings this week in which some of the working molders have been beaten and injured by

CHINESE MINERS IN IDAHO.—Judge Willis Sweet, in the District Court at Mont Idaho, has decided that Chinese have no rights whatever on mining lands in the United States. The decision was rendered in a suit brought by Chinese against Patrick Flynn et al., who last summer jumped claims on the Moose creek, in the Elk City Mining District, held by the Chinese for many years under a bill of sale given to the Chinese by white men. In another decision, involving the Buffalo Hill claims in the Elk City District, white men having leased the said claims to Chinese and being jumped by whites, the judge held that a lease of mining ground to Chinese was invalid and amounted to the abandonment of their claim, unless the plaintiff proves that the Chinese lessees were actually employed to hold and work said ground on behalf of the plaintiffs. The suit for ejectment was therefore denied. Upon



THE MARSHALL MONUMENT AT COLOMA.

men supposed to be strikers, or in sympathy with them. Steps have been taken, however, to prevent any further demonstrations of this nature.

THE BULLY CHOOP SUIT.—The great Bully Choop mining suit of George A. Cornwall of Napa against ex-Senator C. F. Foster of Red Bluff has been decided in favor of the defendant. The suit involved the undivided half interest claimed by Cornwall in a valuable group of mines in Shasta county. His interest was based upon a verbal contract to purchase one-half interest in the mines, which were bonded by Foster in his own name, and who refused to convey the half interest to Cornwall. The judge held that the plaintiff by his own acts had forfeited all his rights under the verbal contract, and judgment was entered in favor of defendant. The case will be appealed.

THE MINERAL section of Irish Mountain, some 220 miles south of Eureka, Nevada, is said to be a very promising one, but there is no means of transportation and the claims are undeveloped.

THE company operating on Cedros Island off the coast of Lower California is shipping enormous ore to San Diego for treatment.

the announcement of the decisions, parties were immediately organized to oust Chinese miners in Pierce City, Elk City and other mining camps in Northern Idaho, which are Chinese strongholds.

A MOVEMENT is on foot among the salmon cannery men and agents to come to some understanding whereby the production of the coming season will not be as large as it was last year. The most careful estimates show that there is still a stock ranging from 200,000 to 250,000 cases of 1889 salmon in the hands of the producers. Advice from Portland, dated April 15th, says: "Owing to a dispute between the cannery men and the Fishermen's Union no salmon are being canned on the Columbia, and the headquarters of the salmon business is at present in this city. There are a good many fish running in the Willamette, and parties are fishing despite the union and selling tons of fish here for three cents a pound. The fish are being salted in barrels and shipped by the carload for Germany and Russia, where the salt will be extracted by some peculiar process and the fish canned, thus avoiding the duty on canned goods. Unless the trouble between the fishermen and the cannery is settled, a very large amount of salmon will be disposed of in this way. The fishermen on the Columbia a year ago got 50 cents a fish. They organized as fish become scarcer and fishermen more numerous and got 50 cents, then 75 cents and finally \$1 a fish. This year they are striking for \$1.25."

Silk Culture in California.

We alluded recently to the progress shown in the last report of the Ladies' Silk Culture Society of California, and urged that the organization was enthusiastic in its work, and was working for the public interest alone. We notice that Representative Morrow has presented in Congress a memorial which was referred to the Committee on Agriculture as follows:

"The members of the Board of Directors of the Ladies' Silk Culture Society of California respectfully represent that the Ladies' Silk Culture Society has been duly incorporated and has an organized existence for more than five years, during which time it has energetically encouraged silk culture in California. Fifteen acres of land have been purchased at Piedmont, Alameda county, seven acres of which were planted with mulberry trees, sufficient to yield an immense quantity of leaves for feeding the worms. In addition, a cocoonery has been built, and the society has distributed great quantities of silkworm eggs to all parts of the State."

The society feels that any effort to divert Government aid to new and untried channels would involve an unwise and useless expenditure of public money. The effect of such experimental work would be the placing of silk culture where the ladies found it five years ago.

There is much significance in this last claim which is urged upon the attention of Congress. There are silk projects which do not enjoy the confidence of the California people, though they may be zealously advocated at Washington.

THE SECRET OF CHEAP BUILDING.—A man who is resolved to be independent of landlords can build a very comfortable house for from \$2000 to \$2500. He can have sufficient room, and a house with a decent exterior and a plain interior. He ought, first and foremost, to provide a bath-room, even if he cannot buy a slate mantel. It will be the wisest in the long run to have a bath-room. Ask any woman who has had the care of two or three children how much a bath-room saves her. The larger the family, the greater the saving in work and worry, which is more wearing than work. If a man has only \$2000 and a large family, he must sacrifice something or deny himself something when he builds. If he is wise, he will contrive closets and cupboards, a style of house that renders running up and down stairs unnecessary (there is nothing so tiresome as going up and down stairs), make his dining-room large enough for a living-room, and see that the arrangement of the kitchen is labor-saving. Bay windows and pretty trimmings can all be dispensed with. There are people who do not seem to have any clear idea of the things that are appropriate in a cheap house. Substantial fixtures rather than pretty trimmings are what is needed in a cheap house. Good ventilation, ample room, plenty of light and warmth, may be obtained if a man desires to insure it in building for his own use, at a very moderate outlay. But then he must hold to please himself instead of vying with his neighbor.

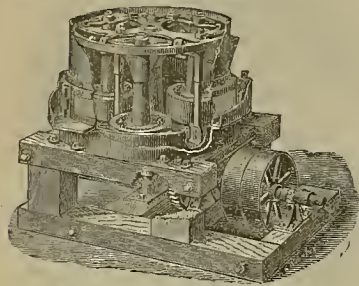
FIREPROOF SHUTTERS AND DOORS.—The Boston Manufacturers' Mutual Insurance Company says that the best fire doors and shutters are made of two or three thicknesses of solid wood so adjusted to each other as not to be liable to warp, and covered with sheet iron or tin plated with the joints carefully looked. The wood will become carbonized, but the sheet metal will keep out the oxygen and prevent burning, so that the door or shutter will remain solid and strong for many hours, while iron or steel shutters would warp and bend and fail to keep the opening closed.

A NEEDED WORK.—The Government appears to have under serious consideration a proposition to construct a canal around Niagara Falls to accommodate American lake shipping and war vessels in case of an emergency. According to the plans under consideration, it will cost \$23,000,000 and will have a depth of 20½ feet. The necessity of such a canal, it is argued, is made apparent by Canadian discrimination against vessels of the United States passing through the Welland canal.

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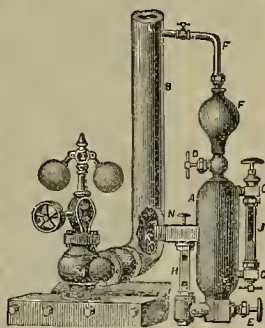
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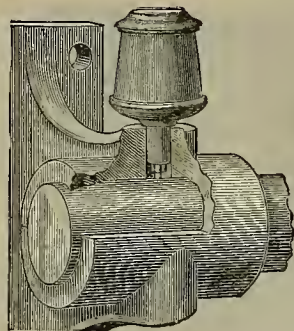
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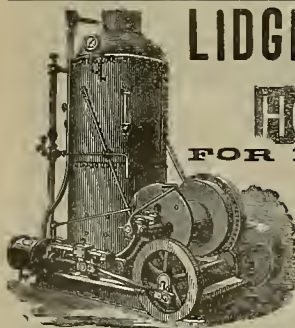
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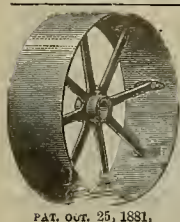
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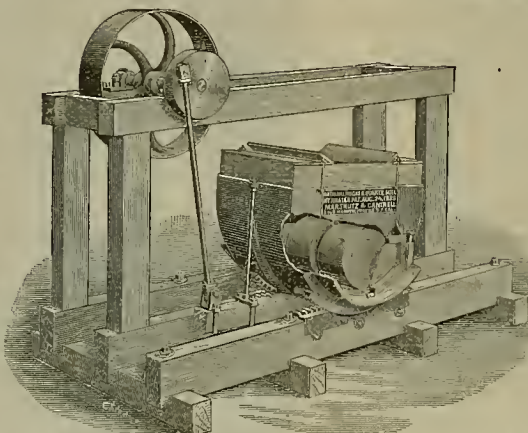
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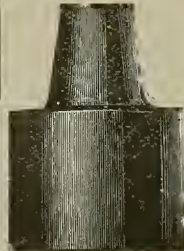
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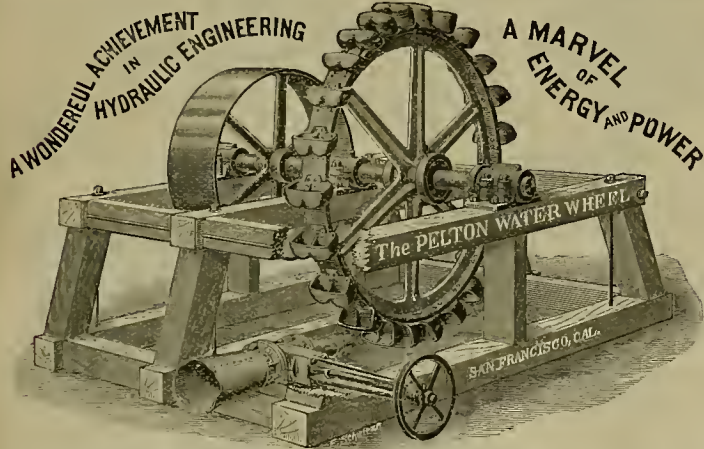
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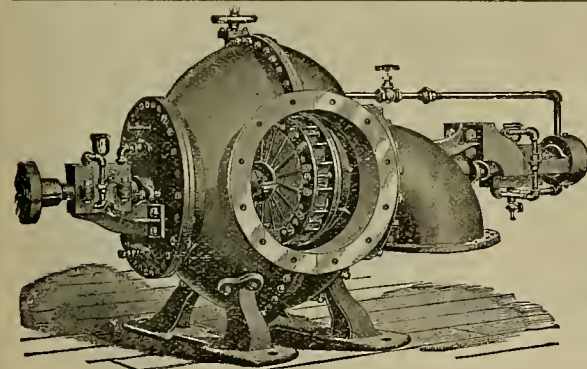
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Assessment Notices.

GRAY EAGLE MINING COMPANY, Local
 tion of principal place of business, San Francisco, California. Location of works, Placer county, California.
 Notice is hereby given, that at a meeting of the Board of Directors, held on the 1st day of May, 1890, an assessment, No. 17, of five (5) cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 11, No. 303 California street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 10th day of June, 1890, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 30th day of June, 1890, to pay the delinquent assessment, together with the costs of advertising and expense of sale.

By order of the Board of Directors.
 J. M. BUFFINGTON, Secretary.
 Office, Room 11, No. 303 California Street, San Francisco, California.

GOLD HILL MINING COMPANY—Location of principal place of business, San Francisco, California; location of works, Grass Valley, Nevada County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 17th day of April, 1890, an assessment (No. 9) of Twenty-five Cents per share was levied upon the capital stock of the Corporation, payable immediately, in United States Gold Coin, to the Secretary, at the office of the Company, Room 20, Phelan Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 24th day of May, 1890, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 10th day of June, 1890, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors

C. A. GROW, Secretary,
 Office, Room 20, Phelan Building, San Francisco, California.

DIVIDEND NOTICE.

OFFICE OF THE PACIFIC BORAX, SALT AND SODA COMPANY, San Francisco, April 30, 1890.
 At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 31) of One Dollar (\$1.00) per share was declared, payable SATURDAY, May 10, 1890, at the office of the Company, No. 230 Montgomery Street, Rooms 11 and 12. Transfer Books close May 5, 1890, at 3 o'clock P. M.

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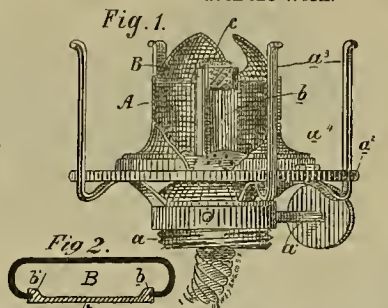
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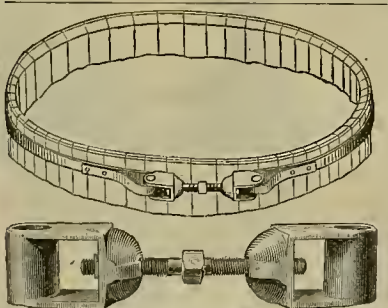
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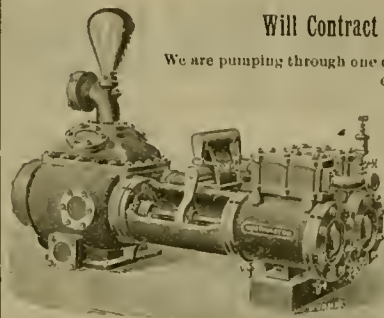
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ALUMINIUM.—Its History, Occurrence, Properties, Metallurgy and Applications, including its Alloys. By Joseph W. Richards, M. A., A. C., Instructor in Metallurgy at the Lehigh University. Second edition, revised and greatly enlarged. Illustrated by 28 engravings and two diagrams. 550 pages. 8vo. Price \$5.00, by mail, free of postage to any address in the world.

CONTENTS.—CHAPTER I. History of Aluminium. II. Occurrence of Aluminium in Nature. III. Physical Properties of Aluminium. IV. Chemical Properties of Aluminium. V. Properties and Preparation of Aluminium Compounds. VI. Preparation of Aluminium Compounds for Reduction. VII. The Manufacture of Sodium. VIII. The Reduction of Aluminium Compounds from the Standpoint of Thermal Chemistry. IX. Reduction of Aluminium Compounds by means of Potassium or Sodium. X. Reduction of Aluminium Compounds by means of Potassium or Sodium (Continued). XI. Reduction of Aluminium Compounds by the Use of Electricity. XII. Reduction of Aluminium Compounds by other means than Sodium or Electricity. XIII. Working in Aluminium. XIV. Alloys of Aluminium. XV. Aluminium-Copper Alloys. XVI. Aluminium-Iron Alloys. XVII. Analysis of Aluminium and Aluminium Alloys. Index.

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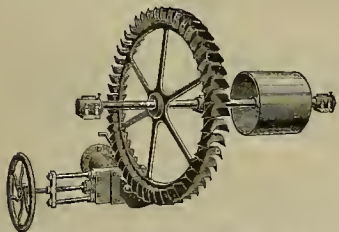
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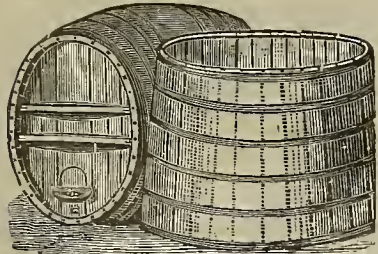
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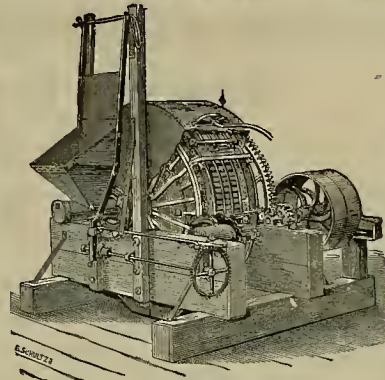
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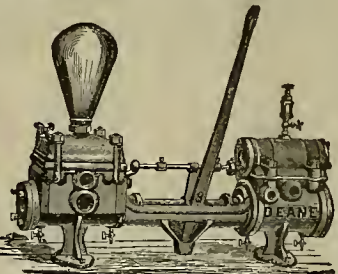
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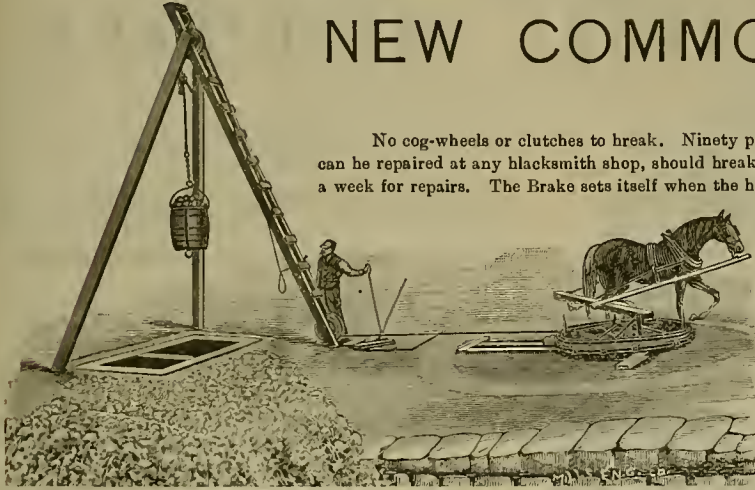
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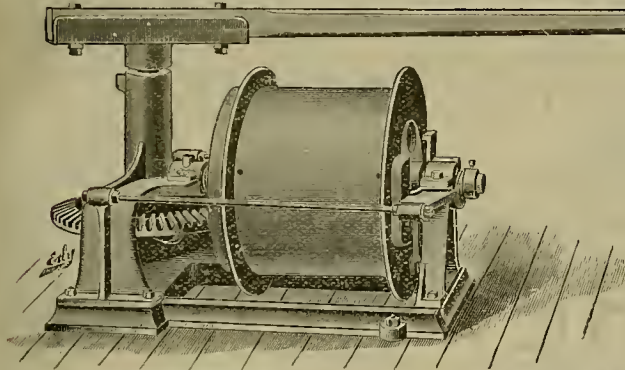
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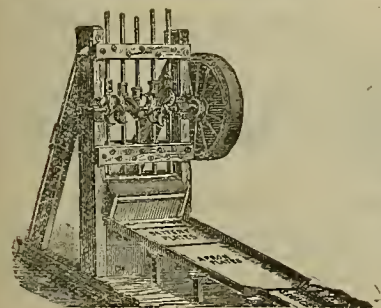
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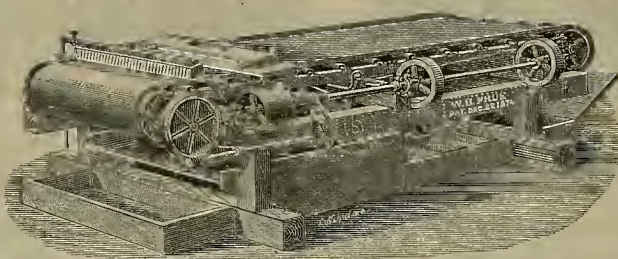
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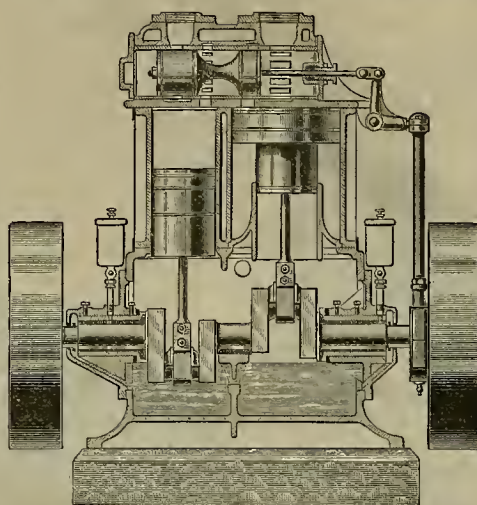
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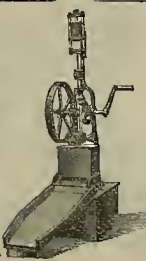
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N. B.—CHAPPELL, Butte Co., Cal., Nov. 10, 1889.—Mr. Jas. Day, Chico: The little mill is a daisy. It comes up to all expectations, it works perfect in all respects. Yours truly,
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VOL. LX.—Number 20.
DEWEY & CO., PUBLISHERS.

SAN FRANCISCO, SATURDAY, MAY 17, 1890.

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A Wet-Crushing Silver Mill.

For milling ores, those that admit of direct amalgamation without preliminary roasting, can be treated the most economically. These ores, after passing through grizzly, rock-breaker and ore-feeders, are crushed in the battery, the pulp passing from these to settling-tanks, or if the Boss Continuous Process is used, directly to the pans.

When the crushed ore and water, or pulp, is discharged from batteries into settling tanks, it is allowed to remain standing until the ore has settled to the bottom. The water is then pumped off into tanks provided for the purpose and used again in the mortars.

The crushed ore remaining in the tanks is shoveled out and into the pans in regular charges of from one to two tons, according to their capacity. Water is then added until the pulp is of the proper consistency, and which is then thoroughly stirred and ground between the shoes and dies in the pans. Salt, bluestone and other chemicals, such as may be required for the proper treatment of the ore, are added; and, after the pulp is sufficiently ground, the muller is raised so that the shoes and dies no longer grind, and the quicksilver is introduced in sufficient quantity. By the action of the currents formed in the pan, the quicksilver is disseminated in small particles throughout the pulp, thus coming in contact with the precious metals and forming amalgam. The ore is treated in the pans from one to eight hours, according to its character. From the pans the pulp with the amalgam and unused quicksilver is discharged into the settlers placed immediately below the pans, one settler, as a rule, taking the pulp from two pans.

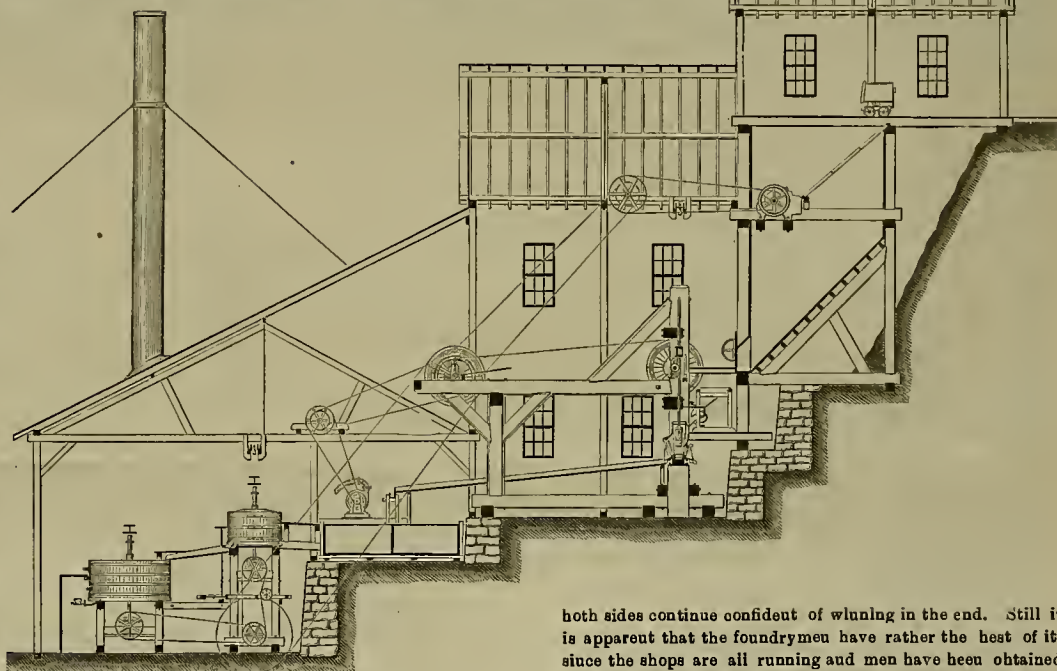
Here more water is added for the purpose of thinning the pulp and allowing the quicksilver and amalgam to settle to the bottom, while the lighter pulp is kept in suspension by slowly revolving stirrers. This is now drawn off through discharge spouts in the sides of settlers and allowed to run to waste. The quicksilver and amalgam that have collected in the bottom of settler are drawn off and strained so as to separate the superfluous quicksilver from the amalgam. The amalgam remaining in the strainer is then placed in retorts; the quicksilver being vaporized by the heat, leaves behind the gold and silver, which are then taken out in retorts, melted and run into ingot molds.

The engravings show a standard type of a wet-crushing silver-mill of this class, as made by the Fulton Iron Works of this city. A sluice will be seen leading from batteries to settling-tanks in front of and below them. The pans immediately below the tanks are now charged by settled pulp out of the tanks, and after grinding and amalgamating are completed are discharged into settlers.

The Molders' Strike.

Several more molders from the East arrived this week and were at once put at work in the foundries without molestation. Still others

are expected shortly. The Union Iron Works now has its full quota of molders, though some of the other foundries are still short-handed. This is the eleventh week of the strike and



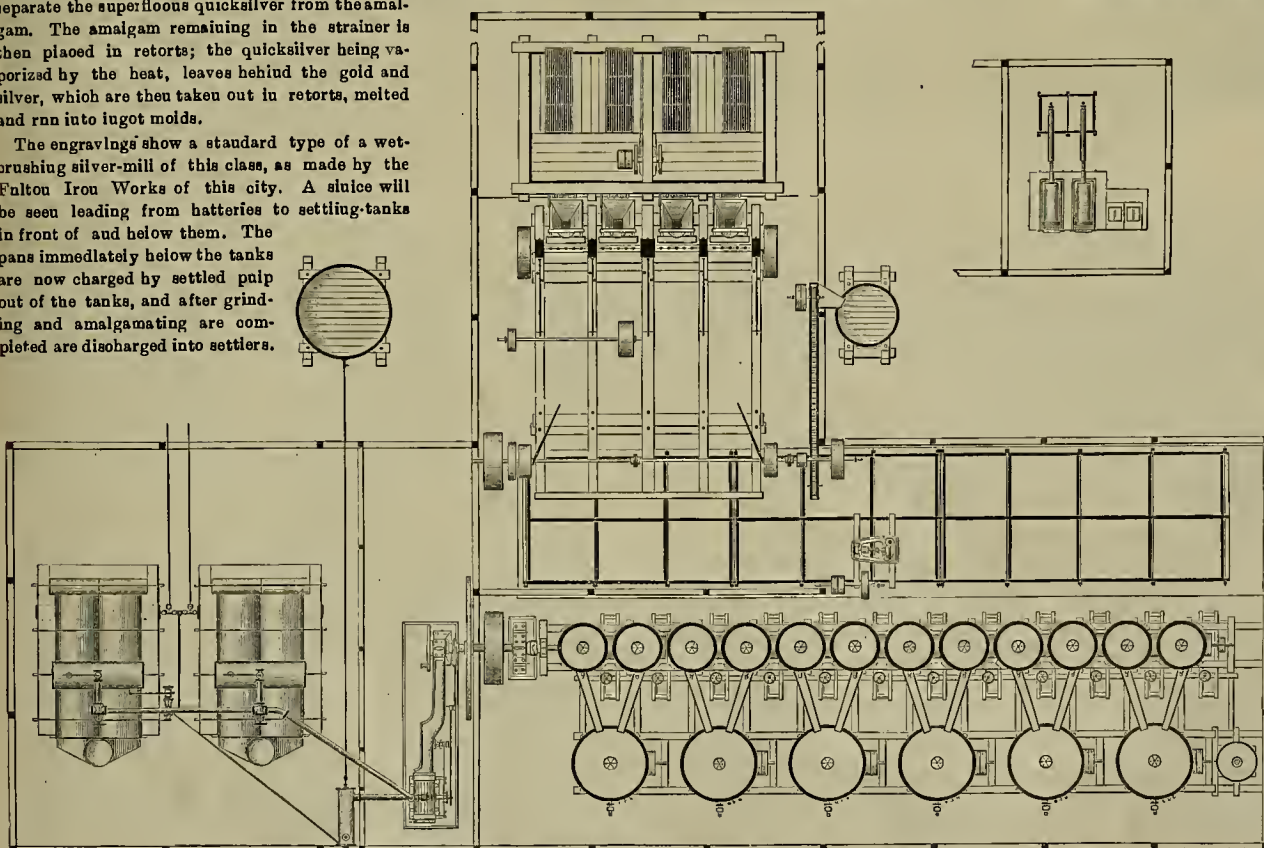
WET-CRUSHING SILVER MILL.

both sides continue confident of winning in the end. Still it is apparent that the foundrymen have rather the best of it, since the shops are all running and men have been obtained from the East. When the strikers get any of the imported men to leave, others are brought to fill their places.

Some Japanese molders applied for work at one of the big foundries this week, but, although they were found to understand their business, they were not given employment. The foundrymen say they can get all the men they want from the East, and that they will be able to keep their shops running steadily in the future.

CONCENTRATION WORKS PURCHASED.—Allen C. Mason of Tacoma has purchased for the Parke & Laoy Machinery Company of Portland, Or., the concentrating works in the Salmon River mining district in Eastern Washington, on which over \$40,000 has been spent. He also purchased with it between 15 and 20 silver mines in the Conconully district, and, with the Lone Star mine, which he previously owned, now has the most and the best mining properties in Washington.

BARKER DISTRICT, MONTANA.—Supt. Emrick of the Montana smelter at Great Falls has returned to Helena from his tour of inspection of the Barker district. He says there is an abundance of lead ore there and that the smelter will begin operations on June 1st. The finding of the large bodies of lead ore will enable the smelters of Montana to resume operations. The discovery in the May and Edna mine is equal to first reports.



PLAN OF TWENTY-STAMP WET-CRUSHING SILVER MILL, TANK SYSTEM.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

Mines and Mills of Shasta County.

NUMBER II.

[From our Travelling Correspondent.]

Three miles above Redding is Middle Creek, a R. R. depot for the upper Trinity county travel. There are here, also, postoffice and telegraph facilities, a hotel and a fine well of water to refresh man and beast. Within a short walk from the hotel is the once celebrated tellurium mine of Shearer & Ratler. From this mine was taken some of the finest specimens of telluride of gold that have been found in the State; a large lot of this ore was sent to Colorado, where it is said, it was treated successfully, but the expense attending the shipments gave too little profit. There have been several attempts to work the ore on the spot but without success. The value of this property is an unsettled question, from the fact that there is not over 60 feet of depth to the mine. Of late it has changed hands, and is now owned by a company who are running a tunnel for striking the lode at the depth of about 130 feet. The vein is in what may be called a trapish slate. The rock, as vein matter, is heavily sulphuretted, and you see at a glance that for treatment, it wants to be in skillful hands.

About a mile above Middle Creek, on the road to Shasta, is the Gem mine and mill. This mine has a development of about 100 feet, and has produced considerable gold, exactly how much I will not undertake to state. The rock, however, is good for pay, and the mine has a better future on development. The lode varies in size, from a small seam to four and five feet; all the rock is milled. There is here a fine 10 stamp mill now run by water-power, but at the time of my visit they expected to close down for want of water. They also have steam-power. The amalgamating appliances to mill are copper plates and blankets—a long string of blanket sluices, which are at stated times swept down. The property, I was informed, belongs to Miller, Evine & Simons. Not far from this mine, on Salt creek, is the Pugh & Co. mill; this is a Kendall rocker-mill. This is also run by water-power, they having a Knight 40-inch wheel (the wheel at the Gem is a Pelton). This mill having been but recently put up, they are hardly in shape for big work, but what they will do, or rather have done, has been very satisfactory; they are working small lots of ore from surrounding mines. From the arrangements, considering facilities at hand, Mr. Pugh gives evidence of having had experience in gold extraction.

Between here and Shasta town, which is less than three miles distant, there are any number of what I will call prospects, but they call them mines here. The whole country is riddled with veins of quartz, but how valuable they are, no one knows, as there is no development to determine. There are a few, I should say, who are doing some development. A San Francisco company known as the Mountain View is driving a tunnel which will give some 200 feet on their lode. This company has a good property, taking a surface view of it, and they are at work in a way that means mining in the right direction, and which I hope will be profitable as a reward for labor and money.

Ruby, Washington.

EDITORS PRESS:—There is very little to communicate from this part of the country. The principal mines were stopped last December, 1889, since which time little has been done, owing to the large amount of snow and bad condition of roads for teaming. The company are in readiness to operate, and are anxiously waiting for the snow to disappear. The Arlington mill will be completed this season, and will be a gigantic plant with a capacity of 80 tons daily. The Fourth of July mine, owned and operated by a Montana company, are working about 12 men. Their intention is to put on hoisting machinery and sink a two compartment shaft this summer. They have a splendid prospect, and without a doubt the making of a good mine. There has been a heavy loss of stock all over this portion of the country—at least 75 per cent. J. B. TONKIN.

FREAKS OF THE FICKLE GODDESS IN MINING.—Recently Meers, Ayer & Co. have struck the blue gravel obannel on Mooney Flat in Nevada county and found it to pay from \$20 to \$50 a ton. They sunk a shaft but 62 feet before coming upon the gravel, and have since sunk 10 feet, with no sign of bottom. Some years ago, a company of men in search of this same golden channel ran a tunnel of great length through very hard rock, at a cost of \$250,000, but in such a way as to almost strike it without touching upon it. They gave up in disgust, and now, after years have passed, come men who, after a few days' work, pop down into the ancient treasure-house amid the golden nuggets. There is added another to the thousand instances of the fickleness of the goddess of mining fortune in dispensing her favors.

The Deep Gold Placers of California.

NUMBER VII.

Written for the Press and Copyrighted 1890, by HENRY G. HARKS, F. G. S. A., F. G. S. J.

Bedrocks and Lavas.

The word "bedrock" was coined by the miners of California and applied to the rock on which the auriferous gravels lie as on a bed. There is nothing in the term that would indicate the nature, lithological or otherwise, of the rocks themselves. They are very interesting and well worthy of careful study by the miner and geologist, for they are but little known.

The bedrocks differ with geological position, but there is a remarkable similarity in those on which the deep placers lie. They are argillaceous schists alternating with slates and bornblende schists, and are sedimentary without reasonable doubt. They were deposited in the bed of an ocean where they lay until elevated by the upheaval which produced the Sierra Nevada, and being fissured and slaty, very many quartz veins were subsequently formed, from which gold is seldom absent.

The bedrocks in some hydraulic mines do not generally differ from those of the drift mines. At the Polar Star hydraulic mine in Placer county, it is seemingly sedimentary and highly metamorphic, having evidently been fine silt, and still shows obscure traces of stratification. At Chalk Bluff, also in Placer county, it is generally slate with upturned edges, the slaty cleavage being nearly vertical.

The Manzanita mine in the same county is an exception, the bedrock here being a decomposing granite; when first exposed in piling it was quite hard, but is now assuming the character of coarse granite sand. At the Milton hydraulic mine, slate is the prevailing bedrock, which is the case also at Sweetland Creek, where copper shales occur.

At Chalk Bluff there is a peculiarity seen which is somewhat noticeable elsewhere. The formation uncovered by washing is crumbling, or "slacking," as it is expressed by the miners—that is to say, the bedrocks and some of the boulders, which when first exposed were strongly coherent, have now fallen to powder or are so soft that they can be easily crushed by the hand.

At Gold Run in Placer county the bedrock is slaty, and in some parts shows a brecciated structure as if it had been plastic at some time like the serpentines. In the bedrock there are a multitude of very small quartz veins, and a conspicuous incrustation of alum forms on the rocky sides of tunnels and open cuts.

There is a great similarity between the soft auriferous matter in the Edman mine, Plumas county, and the bedrock in the tunnels at Sawpit. The Edman seems to be a tilted glacial deposit through which fine gold is very evenly distributed.

There are a number of abandoned hydraulic mines near Laporte and Gibsonville, Plumas county, in which the bedrock is exposed and may be very conveniently studied.

At the Dutch hydraulic mine near Laporte, the bedrock is sedimentary and in the nature of a horse. It is called by the miners a false bedrock.

Sometimes a portion of the loose gravel in a hydraulic mine at some distance above the true bedrock becomes cemented, a condition which may for a time deceive the miners. An example of this nature may be observed at the Malakoff mine in Nevada county, which was exposed to be the true bedrock until by accident it was discovered that gravel lay beneath; the conglomerate being blasted away, the lower gravel was piped out. On the false as well as on the true bedrock, gold was collected.

In primitive times a large erratic boulder lying imbedded near the surface sometime became to the local prospector a bedrock to which he sank his shallow shaft, and having drifted a short distance without finding the expected gold, departed without knowing the limited area which to him was a bedrock in the true miner's sense. In hydraulic mining on a large scale in modern times, many instances of this nature have been revealed.

The channel at Laporte, from which millions of dollars worth of gold has been taken, is wholly exposed and is an interesting study. It was at this locality that certain features were observed that confirmed my present opinion. The bedrock here is probably sedimentary and metamorphic, some of the slaty rocks are blue in color, being evidently indurated mud or silt, a large portion is highly ferruginous and strangely resembles the so-called "brickbat" of the Georgia gold miners, described in detail in the Fifth Annual Report of the State Mineralogist of California, fol. 141. The lowest depression of the channel, which is too irregular to be the bed of a river, is 75 feet below the plateau on which the town stands.

Examination of Bedrocks.

No. 1.—Argillaceous shale from the Edman mine, Plumas county. Color, gray; when held in certain lights has a semi-metallic luster, slaty cleavage; nearly at right angles with stratification; specific gravity, 1.552; hardness, 5; contains silica, 80.8; alumina, 6.2; oxide of iron, 6.2; in a closed tube gives water; infusible; does not change color with heat; emits a strong argillaceous odor; fine grained, somewhat micaceous, semi-vitreous, homogeneous, almost exactly resembling slates from the bed-

rock at Laporte. This is the typical soft bedrock of the deep placers of Plumas and Sierra counties.

No. 2.—Hornblende schist, Laporte. Color nearly black, micaceous, with glimmering luster; interstratified with very thin seams of quartz; specific gravity, 3.153; streak, light gray; hardness, 5.5; under the microscope shows imbedded glassy crystals seemingly feldspar; this gives the rock the character of a diorite. No sections were made; contains silica, 47.1; alumina, 10.4; oxide of iron, large. This rock does not seem very abundant.

No. 3.—Slaty rock breaking with rough angular fracture, appearing like a slaty serpentine. It occurs in considerable quantities in the banks of Wallis creek, Plumas county.

No. 4.—Serpentine, flank of Mt. Fillmore. It does not differ from the common serpentine so abundant in many parts of the State.

The nature of the bedrocks gives local character to the obannel fillings or boulder-clay; for even in California, where they are similar and all prolific in gold, the obannels in each locality differ among themselves.

From Gibsonville to Nelson Point in Plumas county, the road cutting exposes the slaty bedrock in many places, intersecting it at all angles. A study of the rocks along this grade is very interesting, and a very significant fact may be observed which throws light on the origin of gold in the placers. It may be seen that the slates are intersected by innumerable quartz veins from fractions of an inch to many feet in thickness, and they are all more or less auriferous. The rocks here referred to are all below the Gibsonville and Laporte channels. There is no doubt in my mind that these quartz veins are the sources of most of the placer gold in the deep placers under the lava, as well as that which was taken out of the bed of Nelson creek and at Richmond Hill.

"Both slate and shale are no doubt sedimentary mud or silt, which from grestage have become indurated and in most part were formed at the bottom of the sea. The fossils often contained in them are conclusive evidence of this. Natural forces have bent and warped the strata until they have become plicated like the leaves of a book, or a pile of writing-paper pressed laterally. In slate quarries, lines of stratification of various colors may be seen marking the different periods of deposit; the lines of cleavage lie generally in a certain direction, which is called the strike; the inclination is the dip. These were all laid in horizontal strata. Slate is altered shale, which, instead of cleaving in the plane of stratification, now divides at an angle with the natural deposition, called cleavage planes. The line of strike in the slate is almost invariably parallel to the trend of the mountains and the upheaval in the surrounding country, from which we may infer that some lateral pressure has bent the strata and caused at the same time the slaty cleavage.

"To prove this, Mr. Sorby of London made some interesting and conclusive experiments bearing on this subject. He subjected a portion of clay without cleavage or stratification to very great pressure. The original mass contained scales of oxide of iron, which were distributed throughout the clay without regularity. The clay was reduced by pressure to half its volume. The result of these experiments was the development of certain singular phenomena. The scales of iron oxide had arranged themselves in parallel lines, and a slaty cleavage was now apparent, the cleavage planes being at right angles with the pressure applied. Prof. Tyndall has shown that pure white wax can be made to cleave into parallel scales under sufficient pressure. Were these experiments not enough to prove that slate, unlike shale, has been under great pressure, other facts might be stated.

"In the Silurian slates of Europe the imbedded fossils are frequently distorted, and the elongation is always in the direction of the cleavage planes, showing that the movement of particles which caused the lamination was in the line of least resistance, or at right angles with the pressure. When there are no fossils present, small gravel and pebbles are found to be arranged like the iron scales in Mr. Sorby's experiment, with the longest axis in the direction of the dip. When neither fossils nor large particles are present, a thin slice placed under the microscope will show the finest particles and accidental scales of mica arranged in the same manner. It may be assumed that any fine-grained sedimentary rock submitted to sufficient pressure by the force of nature, will develop the same slaty structure." (21 Annual Report of State Mineralogist of California, Sacramento, 1881.)

Lavas.

Geologists make a distinction between eruptive or volcanic igneous lavas and the fissure subterranean or plutonic igneous lavas. The former is known to have been intensely hot, and fluid from that cause, but no one seems to have been bold enough to assume that the latter may have been plastic and semi-fluid from the presence of much water; in other words, that they are eruptive mud, and were never much hotter than boiling water. While I am not prepared to assert that this was the case in California, and that a deposit of this character covered and protected the deep placers, I shall lay before my readers certain facts for their consideration, leaving them to draw their own conclusions. A large portion of the United States is covered by lava sheets of this nature, far too extensive to be volcanic flows, and the absence of great volcanoes makes such an ori-

gin still more improbable. In Europe and Africa also, vast areas are known. But to confine ourselves to California, we find that our sheet lavas have peculiarities worthy of the careful attention and study of geologists.

It is well known that certain volcanoes sometimes eject great quantities of liquid mud. The crater of "Aguila" in Guatemala has never been known to pour forth anything but mud and water. In 1817, the volcano of Idjen in Java gave birth to an eruption of water and mud boiling hot and strongly acid. Geikie, one of the highest authorities on modern geological science, admits that "mud lavas or aqueous lavas in many respects behave like true lavas. This volcanic mud eventually consolidates into one of the numerous forms of tufa." A flowing mud lava, being largely composed of water, could in no sense be igneous. It is my opinion that many rocks classified as plutonic, are of this character.

"In 1698 the volcano of Cargnarszo, contiguous to and probably connected with Chimborazo, sank in and covered 50 square miles with mud. It is not in fact by burning lavas that the volcanoes of Peru and Quito exercise their ravages, but by torrents of mud and water; the mud when first ejected has the consistency of pap, but it speedily hardens, and occasionally contains so much combustible matter that the inhabitants make use of it for fuel." (New System of Geology, etc., by Andrew Ure, London, 1829.)

A remarkable circumstance bearing on this subject is recorded in a paper published in the quarterly journal of the Geological Society, February, 1890 by F. M. Corpi, entitled "The Catastrophe of Kantzorik, Armenia."

The author states that on the second of August, 1889, the village of Kantzorik was inundated by a flow of soft mud, resulting from the bursting of the Eastern Mountain. The village was buried and 136 villagers perished.

Mr. Corpi thus describes this singular deposit as seen by him:

"From this point to the foot of the Great Eastern Mountain (which is situated at the extremity of the valley in the direction from east to west), and for a distance of seven to eight kilometers and for a width varying between 100 and 300 meters according to the configuration of the ground, stretched like a vast, motionless river, a mass of solidified marly mud, the greater part of which was of a bluish-gray color, and the remainder of various other tints. This material, which, taking account of the superficial and the inclination of the flanks of the mountains and hills forming the valley, may be estimated approximately at more than 50,000,000 cubic meters, has the appearance of an undulating sheet."

Similar phenomena may have been common in past geological periods.

Aspelmen of diorite was sent to me some years ago from New Zealand, in which was imbedded a fossil shell. If this rock had been igneous plutonic as supposed, the presence of the fossil would seem impossible. The specimen is now in the cabinet of F. A. Kimball at National City in this State.

That the columnar structure generally thought to be peculiar to basalt is the result of desiccation, and that sedimentary deposits assume this form as far as conditions will admit, may be proved by riding over the smooth, treeless plains known as dry lakes, so common in the inland basins of California. It may be seen that the fissures caused by drying, nearly all form pentagons, and it requires only the exercise of imagination for the reader to believe himself crossing a plateau of basaltic columns extending downward indefinitely.

About a century ago geologists were divided as to the origin of the basalts, traps and other rocks. The result of my study of these in California convinces me that the question is still unsettled.

The controversy was between the Neptunists, followers of Werner, and the Volcanists, with Hutton as leader. Among other writers most interested, may be mentioned Playfair, Sir James Hall, Jameson, Murray, Hope, Seymore, Kirwan, Patrin, Dolomieu, Saussure, Brochant, Fajjas, Wallerius, Duhousson, Pinkerton, Ure and others. Fajjas, an ardent Volcanist, admitted that common trap was not of volcanic origin.

Dolomieu (quoted by Patrin) says: "There is such a vast number of Egyptian monuments in the Borgia Museum at Veletri that they are almost sufficient to constitute the whole Egyptian Lithology. Many are formed of stones which have the qualities attributed to basalt; not one is volcanic."

Nearly all German scientists in the time of Werner believed that trap rocks were formed by water.

"Basalt often repose immediately on coal at Meisener near Cassel. Now if this basalt was volcanic it must necessarily have produced the combustion of these beds of coal."

"The remains of vegetables and animals which are found in the trap rocks could not in like manner have resisted the volcanic heat without being destroyed." "Cavities filled with water, such as enhydriac agates found near Vicenza in Italy in secondary trap mountains, entirely destroy all supposition of a volcanic origin." (Brochant, quoted by Pinkerton.)

The following facts are well known to those familiar with the deep placers of California. Trees are found in the lava unburned, leaving the impression of the bark. Mr. A. B. Wood saw in the Mountain Gate drift mine, Damascus, 900 feet below the surface and 7000 feet in the tunnel, a piece of wood six or eight

inches in diameter, imbedded in the so-called lava, and it was not charred. Mr. Goodyear saw a fossil tree standing vertically in gray cement. Many similar instances are known.

I have conversed with a number of gentlemen of large experience in mining the deep-drift placers, who were unanimous in denying any indication of metamorphism at the line of contact between the loose gravels and the superincumbent lava. On making an uprise, when the lava was reached, it was easy to pick down the gravel, leaving a smooth ceiling or roof above.

As additional evidence that the lava is not volcanic, I have the word of the same gentlemen that in drifting they sometimes come to a wall of lava, so called, to which the gravel extends and a slight upward bending of the bedrock is observed. At the line of contact no change in the condition of the gravel is ever seen, which would certainly have been the case had the lava been igneous. Mr. J. B. Thomas once sunk a prospecting shaft alongside one of these dykes expecting to find the mass resting on a bedrock or on gravel, but such was not the case although his explorations reached far below the channel bedrock.

The possibility of an eruption of mud from a local volcanic mountain being admitted, it is but a step to concede one of far greater magnitude issuing from fissures of the crust of a contracting earth.

Several varieties of lava occur in the region under consideration. One black scoriae and crystalline (1), rich in olivine and without doubt igneous volcanic, but the quantity is very small and the localities few. The so-called lava onp (2), including the Gibsonville ridge, is gray, porphyritic, non-crystalline or crypto-crystalline, and resembles andesite from Colorado. This lava covers the country far and wide. It forms table mountains and is the lava under which the deep placers lie, so often referred to in this paper. Another variety (3) is very common and widespread at lower altitudes. It is called "white lava" by the miners, and is quite extensively used as a building stone at Mokelumne Hill in Calaveras county, at St. Helena in Napa county and elsewhere. It is generally considered a volcanic ash. It is a very good and convenient building material, easily cut, resistant to fire, as experienced at Mokelumne Hill during a conflagration which occurred some time since.

Another variety (4) occurs in quantity near Messenger's House in Calaveras county, and elsewhere. After examining this, it is not difficult to believe the statement that the Indians used to make mortars of this formation and were not disappointed in their expectation that the vessels would harden with time and exposure. The following is my examination of the varieties referred to above:

No. 1.—Several specimens examined chemically and microscopically were from Sawpit and Spanish Peak, Plumas county. To the eye they seemed homogeneous, dense, fracture conchoidal; if closely examined, much olivine was seen in some portions; a thin section under the microscope revealed the true crystalline structure of basalt. This specimen was very similar to the dense basalt of the Sandwich islands, of which the ancient inhabitants fashioned their rude stone axes, with samples of which I have compared it.

No. 2.—(A) Porphyritic specimens from near Gibsonville. Occurs near road between Lyorte and Gibsonville; resembles andesite; color of matrix, bluish gray; obsidian crystals creamy.

(Continued on page 337)



THE VINEYARD IN AUTUMN—FROM GRAPE TO RAISIN IN THE SUNSHINE.

Singular Geological Phenomenon.

On J. C. Hartman's ranch, two and a half miles north of town, a singular geological phenomenon has occurred. About three acres of land suddenly sank about 50 feet, leaving perpendicular walls on three sides, or in the shape of a semi-circle. The horizontal strata, consisting of indurated clays and friable sandstone, are exposed below the soil, presenting a beautiful appearance. While there was a gradual slope to the west, yet the depression does not partake of the nature of a slide but is a vertical sinking of the earth. The elevation is 1150 feet above the sea level and the land has been tilled for several years.

In this range of hills, which culminates in the Sulphur range of mountains, are many indications of bituminous matter and of sulphur. This region, especially a little farther north, is subject to solfatara, some of which are still in operation, while others have become extinct. In these the bituminous matter at some distance below the surface is finally burned out, leaving a cavity of greater or lesser extent, and not being able to support the superincumbent weight, it is liable to sink from the top. This may account for the sinking of the land on Mr. Hartman's ranch. In Adams' canyon a living solfatara may be seen, and one near Rincon. Both emit heat and steam and sulphurous fumes. An extinct solfatara may be seen on the mountain-side, a mile southeast of Santa Paula. The earth has sunk, leaving walls of variegated sandstone, which may be seen several miles distant.—*Ventura Free Press.*

SIX-MILE CANYON.—The *Virginia Enterprise* says: If any one has ore to crush he can go down in the canyon and readily engage

nearly all the stamps that are there. They are nearly all idle, and those who have stamps have no use for them over four or five days each month. Tom Hully has two five-stamp mills in the canyon, but he is not crushing. He has lately purchased the California mill tailings, paying \$30,000 for about 5000 tons. He will first run them through for the quicksilver, and he will then let the action of the air oxidize them for some time, and then run them through again. Pfeifer, who owns the lowest mill in the canyon, is building an over-shot wheel, because he finds the burdy-gurdy wheel is too expensive. He has two stamps, works his own tailings and does a little custom crushing. Jennings's, Boswell's and Lonkey's mills are run on tailings. Fisher's mill of four stamps runs a little rock and tailings. Johnson's and Bruce's mills have one pan each and no stamps. Bowie's mill has two stamps and two pans. It can crush but 1000 pounds of ore to the stamp in 24 hours. Nearly all the millmen own strings of sluices, and they do their own sweeping and all their other work.

Grapes for Raisins.

The California raisin industry is one of our most profitable, promising and rapidly extending specialties. Not only so, but the raisin is winning wide reputation for our State in distant parts, and our raisin districts, especially in the San Joaquin valley, are enjoying a good share of the influx of population. A single branch of production which made an outturn last year of one and a quarter million 20 pound boxes, or in round numbers, 25,000,000 pounds of dried fruit, and which bids fair to increase this amount this year possibly 33 per cent, is naturally attract-

ing much attention. This interest is also stimulated, no doubt, by the fact that in spite of this product and the foreign product as well, there is this year a great shortage in the world's supply of raisins. The outlook is that those who have been planting raisins so resolutely and confidently during the last few years will find themselves luxuriating in generous returns this year if no unfavorable influence prevents the realization of present crop promise.

In view of the popularity of the raisin interest, we have thought that we could not better please our readers in distant parts of the world and in parts of our own coast where raisins are not now produced, than by selecting two pictures which illustrate two stages in the year's progress in a California raisin vineyard. One is a winter view in which are seen the vines in their regular rows correctly aligned from any point of view. The foliage has fallen, the canes have been pruned back to a few buds and nothing appears to the casual observer but gnarly stumps with crests of pruned spurs, the old dark black, ragged, uninviting; the ground covered with rubbish of dead leaves and husks and clods. Such is the aspect of a vineyard until the winter rains start the growth of verdure along the rows; then follow the plowing and harrowing, or cultivating, and the sorry vine stumps are surrounded by an even surface of well-pulverized soil; soon the vine feels the warmth of the spring sunshine, the foliage starts, the gnarly, spindly head of the vine is hidden beneath a tuft of crisp, delicate leaves; then if frosts forbear, or shoot the canes with twining tendrils, the vine stump is lost to sight, the field becomes an expanse of beautiful green mounds. Back and forth go the cultivators, each time the pathway of brown soil becoming narrower until at last vine links tendril with vine, and the field is a sea of green; vine stump, brown soil, everything is concealed beneath the dense mantle of verdure. Such is the California vineyard at midsummer. In young vineyards there will be protruding stakes and bare patches of soil, but in the old vineyards there is neither sign of stake nor trellis; the vine pruned to support its own weight, except such as it can distribute over the surrounding soil, needs no support. There is nothing handsomer in the midsummer landscape than the green of the vineyard contrasting with the browns and yellows of the grain fields, or the unimproved hillsides. Orchard is green as well, but the vine has a density of foliage and a uniform verdure which can be selected as far as the eye can perceive.

As the summer shades into autumn, the scenes in the vineyard partake more of the character shown in our second engraving. The heavy clusters of ripe grapes are gathered, spread upon wooden trays and exposed to the clear sunshine and warm dry night-air of the interior valleys of California. As the available space between the vines does not always accommodate the fruit, all surrounding spaces are employed. In the engraving the avenues around the vines are spread with trays and the banks of the irrigation ditch are also covered,



WINTER SCENE IN A RIVERSIDE VINEYARD—PRUNING AND CULTIVATING.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Calaveras.

GRAVEL.—Calaveras *Chronicle*, May 10: With the few days of fair weather, giving the roads a chance to dry a little and become passable, movements began in mining operations, and while not yet fully awakened, promise to be so when the weather is fairly settled and the condition of the highways permit ordinarily easy travel. Mr. Geo. R. Tuttle has begun active operations in prospecting for blue lead gravel in Chili gulch, this week. Water-power will be put on and a 6-foot Donnelly wheel will be used on a 30-inch diameter hoist. Mr. Tuttle is putting up a good rig and so arranging it that in case pay dirt is not found he can easily and cheaply remove to some other prospect. From all that can be learned, however, he is more than likely to strike it rich in his present location. McSorley & Co.'s gravel mine, in Chili gulch, recently bonded, is, we understand, in full blast.

GOLD CLIFF.—*Mt. Echo*, May 8: Mr. Garrard, superintendent of the Gold Cliff mine, finished the laying of the water-pipe this week and turned the water on the wheel which runs the Tulloch concentrators. They worked splendidly and far exceeded the most sanguine expectations.

El Dorado.

LOTUS.—Georgetown *Gazette*, May 8: The Wagner Bros. have been engaged the past two weeks in moving the old Pascal mill from Granite Hill to their claim west of here. It will be rebuilt and put in operation at once. Their mine from all appearances has turned out to be a good one, and to save all the yellow metal the young men have invested in a mill and hoisting works complete. This will be a fine thing for our town, and we wish them success. The old Stuckslager or Sam Sims mine is soon to start up also. It is owned by a S. F. firm, and the intention is to erect hoisting works and a small mill of some kind. The foreman, a Mr. Dennison of the old Taylor mine, has the work in charge, and will commence operations as soon as possible. Both of these are pocket mines, with some gold in the hanging and foot walls. By having mills all of the gold is saved and there is no loss whatever.

OAKLAND MINE.—*Mt. Democrat*, May 10: J. S. Raw of the Oakland mine returned from the East this week. Since the return of Mr. Raw the pumps have been set at work on the mine, and the shaft will be cleaned out, when the company will let contracts to sink a fine shaft 300 feet below the present lowest point reached.

MACHINERY.—M. J. Ryan of the Oak Consolidated mine near Grizzly Flat has had teams busy this week hauling up the machinery that is to be put up at the mine. The present owners recently paid over the last of the purchase-money, and having satisfied themselves that they have a good mine will push things.

SLATE.—Mr. Bine, superintendent of the California slate quarries, informs us that the increasing demand for slate keeps his yard cleaned out, with orders far ahead of the supply. To meet the exigencies of the occasion, his company has under contemplation the construction of an automatic hoist that will elevate the slate from the quarries to the top of the hill back of Luce's ranch, from which point to town an easy grade for hauling can be secured along the county road.

Inyo.

ACROSS THE RIDGE.—*Register*, May 8: The 40-ton furnace destined for Sylvania is soon to be put in place. It will be located within a few hundred feet of the Esmeralda line. About 60 men are now at work there, and more going. No work will be done in the mine until the immense amount of ore now out is disposed of. At Palmetto, the mill has been hung up on account of snow, but started Tuesday. At Pigeon Springs, Murphy is working the Buster mine. He goes below in a few days to purchase a Huntington roller-mill, to take the place of the two steam arastras heretofore used. Murphy will work over the tailings from the arastras, and afterward turn the mill loose on the large quantity of ore now on the dump of the mine. At Gold Mountain, Fred Vollmer and Pete Kaiser are doing effective work. Our informant says that from a shipment of 2½ tons of rich ore recently shipped by them they received a net cash return of \$3400.

FISH SPRINGS.—The mines in the hills just south of Fish Springs appear to be on permanent paying ledges of low-grade ore. Jones and Elias are now working the Pontas Negros mine, located about a half-mile west of the county road, and a mile and a half from the railroad. The shaft is now down 18 feet; its owners propose to sink 100 feet farther, and if justified by the prospect, put up a mill. The ores carry silver and gold, and are being taken from a 32-inch ore streak in a six-foot ledge. The first assays from this claim were made from rock found two feet under ground, and these tests gave a value of 25 ounces silver. At the present depth assays average about 38 ounces, showing a steady increase with the depth. McCarthy et als. are working an 18-foot ledge of low-grade gold ore. A run and cleanup has just been made of 40 tons of ore from their mine. Commati has been doing well with his mine and arastra.

Mariposa.

THE HART MINE.—*Mariposa Gazette*, May 10: On Thursday we were shown some very rich samples of gold quartz from the present workings of the once famous Sebastopol gold mine, about five miles south of Mariposa. The mine was bonded last fall by Messrs. Ridgway & Hay, since which a shaft 70 feet deep has been sunk, which has shown a well-defined ledge estimated from 18 inches to 2 feet, and about \$40 milling rock, with very rich strata, indicating that there are some rich pockets not far away, and at 100 feet the owners expect to run levels and crosscuts and tap the pay chute left by Mr. Streeter at the time his lease expired. It is a well-known fact in Mariposa that Mr. Streeter, the Lind Bros., Lewis, Anderson, Snow and others have taken out large amounts of coin from this mine in former years, estimated at least \$200,000, and, strange as it may appear, all this was from rock rich enough to crush with a hand mortar and everything else went into the dump pile. The deepest work done in the past was

about 90 feet and it is demonstrated that the deeper the development goes the better it will be. It is expected that a rich strike will be made in the near future, and we hope soon to see this mine a good producer again. A company has just been organized with a board of directors who are thoroughly conversant with this mine, and it intends to push the work as fast as possible, and soon to put up a mill to crush the ore, which is not rich enough to crush with a hand mortar.

THE WHITLOCK MINES.—Jack Farrens brought in some quartz from his claim on Whitlocks the other day, which showed free gold well distributed throughout, and loose in a red ochre formation which was very rich. Mr. Farrens has good reasons for believing that his is one of the many good mines now being prospected on Whitlocks. There is every reason to assure a lively camp in the near future for that locality, as the mines there are looking up well without exception, and the more they are worked the better they prove to be. A few of the more promising ones are the Alabama, Helm's, Duzenberg, Ellingham & Grove's and Heisser & Perego's. All the mines on Whitlock's and Sherlock's creeks are known to be rich, deep mines that only require development to prove their endless value.

Nevada.

THE IDAHO'S NEW ORE BODY.—*Grass Valley Union*, May 10: The new ore body recently struck on the 17 level of the Idaho mine, at a vertical depth of 1900 feet, continues to have all the appearance of a genuine bonanza. This ore body was struck at a distance of 200 feet from the shaft in driving the drift eastwardly to the regular pay chute, which would not have been reached in a less distance than 1000 feet, judging from the dip of the chute as found in the 16 level. The new ore is of an entirely different quality from that found in the regular pay-chute, being highly mineralized, some of it going as high as 15 per cent in sulphurets, and is much darker in color, and the lode extraordinary in size, and the space between the walls at the widest part yet found is 20 feet. The quartz and sulphurets are rich in gold, and even the cab prospects in gold. The drift has now been carried into the ore body a distance of 30 feet, and although this is not far enough to determine whether the ore body is going to be continuous, there are no indications of it giving out, or the lode narrowing its width. The entire face of the ore as exposed prospects well in gold. Although no figures are given out as to the yield per ton by mill process, the statement is made that the ore is as rich as any that has ever been found in the mine, and when it is considered that the regular pay chute within the limits of the Idaho boundaries has yielded over \$11,000,000, and the same chute in the Eureka location gave a yield to the company of over \$3,500,000, it may be imagined that the present find is showing signs of being very important. It is too soon yet to define the direction of the strike of the new ore body, as it was first struck in the floor of the drift, which made it appear as if that was the top of it, but it has since filled the face of the drift and has widened as the drifting has progressed. There were no indications of it on the 16 level, and it may be that it extends downward, going both east and west, but as to the latter direction this cannot well be demonstrated until the shaft is carried down to another level. If the ore holds as now to the eastern boundary of the location the distance will be 1200 feet or more, which will insure an enormous yield of the precious metal, and if it extends downward, as it undoubtedly will, in that case it would be difficult to place an estimate on the value of such a magnificent ore body. As heretofore remarked, this discovery is of exceeding interest in showing the possibilities of deep mining in this district, and will place the quartz-mining industry on a safer and more enduring basis than ever before.

MILLING THE WASTE.—*Transcript*, May 9: At the Pittsburg mine of this district the rock of the old waste dump is being put through the mill at a cost of from 70 cents to a dollar a ton, and from \$3 to \$4 a ton, besides the sulphurets, is being realized, giving enough gold to pay for all the extensive prospecting operations being carried on in the lower workings. The Empire Mining Co. at Grass Valley is also working up its waste with profitable results. Tributaries while working in these mines put aside the lowest grade ore because they did not believe it would pay them to hire it crushed.

Placer.

THE DRUMMOND MINE.—*Herald*, May 10: Wm. Werry, superintendent of the Drummond quartz mine, located a few miles south of Iowa Hill, was in Auburn last Saturday, and from him we learn that work on the mine is progressing satisfactorily, and that the developments are very encouraging. The lower or new tunnel only lacked 25 feet of being into the ledge, and by the time that is in the second roller-mill will be ready to run, after which they will be able to crush from 35 to 40 tons of ore a day. At present they are extracting ore from the old or upper tunnel and crushing on an average a little less than 20 tons a day. The vein is good and strong, averaging four feet, and is all milling ore, and yields right along from \$6 to \$7 per ton. This mine is the property of C. F. Reed of Auburn, and from present indications promises to prove very valuable.

San Diego.

THE NEW MINING COMPANY.—*Julian Sentinel*, May 9: We are enabled to give our anxious readers a partial outline of the work that is contemplated by the owners of the Cincinnati Belle and Gold King and Queen group of mines, who have lately visited the camp for the purpose of inspecting these properties and arranging for the proper development of the same. The true merit and magnitude of the property they found had been underestimated, and that all previous plans of operating the property were entirely too limited. Hence a new and more expensive mode of operations has been adopted. The entire company, including Messrs. Cushman and Rhorer of St. Louis, resolved to surrender their present charter, as it exists under the laws of an Eastern State, and incorporate under the laws of California, increasing the capital stock to \$1,500,000. Col. T. W. Brooks, acting agent of the company, arrived last week and is now busy rearranging the former works, and we learn from him that estimates of a 20-stamp mill are before the builders of San Diego and San Francisco, preparatory to erecting the same on the company's property at an early date. He also informs us that an entire change of operating the property will be made. The present working ore shafts

of the Cincinnati Belle, King and Queen will be abandoned, except as an air shaft, and in their stead will be sunk large and permanent shafts at a more practical point. There will be a temporary suspension of work on the Cincinnati Belle until such time as the new hoist arrives, the perfecting of plans and the many changes that are necessary. This is the first move of grand proportions that has been made in this camp (harring the Stonewall) for many years, and the benefits to be derived from such extensive operations are many.

Shasta.

OLD DIGGINGS DISTRICT.—*Redding Free Press*, May 10: The Central mine, after being idle nearly two years, has made a move in the right direction. Operations were resumed May 1st. This will be a good move for all Shasta county. Mr. W. L. Sharp of Shasta is foreman of the mine. The mines of the Old Diggings are on their way to prosperity and the outlook was never more encouraging. Notably is this the case with the Hart & Fleming mine, which has attained a greater depth than any other mine in the district. The deeper they go down the richer it gets. Mr. Champion has bought a mine at Buckeye and christened it "The Lexington." He has also bought an engine and steam pump and will proceed at once to develop the same.

FROM DOG CREEK.—*Courier*, May 10: L. O. Enochs was down from Dog creek this week, and has been at work in the mines all winter. His report is favorable, although the miners had to contend with unusual inclemencies of weather. The McCourt boys, Randalls and Donahoe, have a claim on the headwaters of Dog creek. They have a tunnel in 230 feet, and are getting close to the ledge, that crops out fine and strong on the surface, and prospects in a manner to excite a forty-miner. Situated just south of this is the bonanza claim known as the Trinity claim of Coyle & Carter, which is being developed gradually. Near to and adjoining the Trinity mine, L. O. Enochs and Tom Luddy have a mine known as the Central, and have been hard at work to develop it for several months. Their tunnel is now in the hill over 100 feet, and 70 or 80 feet more tunnel will certainly tap the ledge, and the surface croppings are such as to indicate that at a greater depth the "golden chest" will be found. All the miners on Dog creek are doing pretty well considering the hard winter, and the placers will show good returns this summer and fall.

QUARTZ.—Ed Taylor, our roadmaster, has owned a quartz ledge at Hogtown near the Council House, and suburb of Shasta, for some time. Recently Ed concluded to see what the quartz was worth on working test. He took unselected 6½ tons and sent it unsorted, to Engram & Wright's arastra, where it was ground up. As a result of the cleanup Taylor has a specimen in the shape of 5½ ounces of pure gold retort. The neighborhood of 15 per cent is pretty good for rock taken just as it came from the ledge.

Tuolumne.

TO BE REOPENED.—*Tuolumne Independent*, May 8: The old Colby claim is to be reopened by Messrs. D. Oliver, J. P. Dart, A. P. Johnson and M. Kelley, work having been commenced last Monday. The old cut and tunnel which had caved in during the past winter is being cleaned out, and we are informed that a steam engine will be put up soon for the better development of the mine. The gentlemen interested are enterprising, experienced mining men.

NEVADA.

Washoe District.

SIERRA NEVADA.—*Virginia Chronicle*, May 10: On the 630 level a southwest drift is advanced 535 feet from the shaft station. Formation, clay and porphyry carrying water.

UNION CON.—On the 1465 level from the north lateral drift, opposite west crosscut No. 4, east crosscut No. 1 is advanced 370 feet, continuing in porphyry.

MEXICAN.—On the 1465 level west crosscut No. 4, 100 feet south of No. 3, from the north drift from west crosscut No. 1, from the main north lateral drift, is extended 241 feet, continuing in porphyry carrying lines of quartz.

OHIO.—On the 1300 level in working south-westerly from the top of the raise carried up 28 feet above the south drift from the end of the east crosscut from the shaft station, following the ore streak found in the raise downward, 65 tons of ore were extracted and raised to the surface, the average assay value of which is \$27.50 per ton.

CON. CALIFORNIA & VIRGINIA.—The 1300, 1500 and 1600 levels continue to yield the usual quantity of ore. Shipped to the Morgan mill 1064 tons and 1300 pounds of ore and to the Eureka 1603 tons and 660 pounds; battery sample assays showing an average value of \$22.50 per ton [2735 tons milled]. Bullion valued at \$19,596.59 shipped to the Carson Mint, and to San Francisco, \$35,956.77.

BEST & BELCHER.—On the 1000 level the joint west crosscut is cleaned out and repaired 90 feet.

GOULD & CURRY.—On the 400 level the northwest drift from west crosscut No. 1 is extended 34 feet. Formation, hard porphyry.

OCCIDENTAL CON.—Continue to extract ore of good quality from the stopes on the 400 and 450 levels. In the 550 level north line west crosscut are cutting out a station preparatory to sinking on the ore developed there.

NORTH OCCIDENTAL.—Work confined to repairs. **NORTHWESTERN CON.**—Sinking shaft below the 100 level. Bottom in quartz.

ANDES.—A 420 level west crosscut 160 feet north of the shaft is in 10 feet, showing clay and quartz seams in the face. The 350 level west crosscut is extended 220 feet, the face in porphyry.

SAVAGE.—Shipped 420 tons of ore, showing an average value of \$23.25 by battery sample assays.

HALE & NORCROSS.—A 500 level east crosscut is advanced 144 feet, and continues in porphyry and quartz, giving low assays. Shipped 1050 tons of ore during the week, showing an average value of \$19.75 per ton by battery sample assays.

WARD COMBINATION SHAFT.—The 1800 level east drift is out 356 feet; the face continues in porphyry.

CHOLLAR.—The south drift, following the ore out in the 750 level east crosscut, 80 feet south of the north line, is out 40 feet, the face in quartz, car samples assaying from \$30 per ton. East crosscut No. 1, 280 feet south of the north line, is in 280

feet, the face in porphyry. East crosscut No. 2 is in 12 feet in quartz, car samples assaying from \$20 to \$25 per ton. On the 930 level the north lateral drift is out 635 feet, the face in porphyry. Extracted 451 tons of ore, battery sample assays showing a value of \$23 per ton.

POTOMAC.—On the 930 level the winze is down 98 feet. The bottom is in clay with streaks of quartz assaying from \$4 to \$10 per ton. The raise above that level is up 123 feet. The roof is in porphyry.

ALPHA.—The 600 level east crosscut is in 62 feet and continues in porphyry. The 600 level south drift is out 53 feet, the face in clay and porphyry.

EXCHEQUER.—The 600 level north drift is out 271 feet, and continues in quartz and porphyry.

CON. NEW YORK.—The 650 level west drift continues in low-grade quartz. The 960 level south drift is in low-grade quartz.

SCORPION.—The southwest drift from the 630 level shaft station is advanced 330 feet and continues in porphyry.

IMPERIAL.—The joint Challenge-Confidence 800 level north drift is out 160 feet from the north line of the South Challenge; the face continues in porphyry.

YELLOW JACKET.—Shipped 490 tons of ore showing average assay value of \$22.25 by battery sample assays.

KENTUCK.—The winze below the 950 level continues in ore.

CROWN POINT.—Shipped during the week 791 tons of ore, showing an average value of \$22.48 per ton by pulp assays. A raise above the 400 level has connected with the 350 level stopes.

CONFIDENCE AND CHALLENGE.—The raise above the 300 level is up 73 feet, the top in low-grade quartz. The joint Imperial 800 level north drift is out 196 feet, the face in quartz.

BELCHER.—The 200 level south drift is out 295 feet and continues in low-grade quartz. The 300 level west crosscut is in 105 feet, the face in porphyry. The 850 level joint east crosscut is out 402 feet, the face in soft porphyry.

SILVER HILL.—The 260 level northeast crosscut from the northwest drift continues in clay and porphyry. The 160 level south drift continues in porphyry.

SEG. BELCHER.—The 850 level Belcher joint east crosscut is in 402 feet, the face in soft porphyry.

JUSTICE.—During the week crushed 190 tons of ore showing a value of \$26.97 per ton by battery sample assays. The raise above the 622 level continues in low-grade ore.

ALTA.—The ore output this week was 315 tons, showing an average assay value of \$23.75 per ton by pulp assays.

OVERMAN.—Shipped 220 tons of ore during the week showing an average value of \$18.75 per ton by battery sample assays. The northwest drift continues in low-grade quartz.

Columbus District.

CANDELARIA.—Cor. Reese River *Reveille*, May 8: This is a fine place for a mining town. On the northeast it is well protected by a high range of hills where the mines are situated and all visible from the town. On the southwest is a gradual grade into the valley, and several roads come in from this direction. There is no timber for many miles. The main street for business is a fine wide street, three blocks on each side, and the buildings are in close connection with each other and most of the business places have fine shade trees in front. The population is about 300 or more. There are employed in the mines, at present, about 60 men. In the Mount Diablo and Columbus several men were discharged a few days ago, and none have been put to work since. So much for the boom. There are a few men working in the Holmes mine. They are not shipping any ore to the mill, which is undergoing repairs. It will be months before it will be in operation. There are many men idle here who have worked in these mines for years, some of whom have been out of work for many months. The mill at Sodaville is to be put in order to work the ores from this place. It is 22 miles from here, and the railroad takes the ore there in bulk.

Eureka District.

ORE SHIPMENTS.—*Sentinel*, May 9: Following are the number of tons of ore shipped from the mines of this district to the Eureka Co. reduction works during the week: From the Dunderberg mine, 185½ tons; Lord Byron, 11 tons; Oriental and Belmont, 3 tons; Silver Lick, 20½ tons; Idaho, 6½ tons, and Mineral Hill, 1 tons. The E. & P. R. Co. shipped 495 tons of ore to Salt Lake during the week from the Diamond, Bullwhacker, Colorado, Richmond and Jackson mines. The ore shipments by railroad are rapidly increasing, over 600 tons having already been transported out of the camp this month. Teams were sent out from here a few days ago after ore from Morey and Hamilton. It is by no means improbable that if the transportation of ore over the E. & P. railroad continues to increase, a daily train will be necessary.

ON STRIKE.—The tributaries in the Richmond mine are on a strike. They demand 60 per cent instead of what they have been receiving. Only two men are at work in the mine.

Jackrabbit District.

DAY.—*Pioche Record*, May 3: The Yuba Co. is sending a force of miners to its Day mine at Jackrabbit and several large teams have been engaged to haul the ore to the furnace.

Tuscarora District.

NEVADA QUEEN.—*Times-Review*, May 9: North gangway from 600-foot level station of North Belle Isle, has been advanced 22 feet.

NAVAJO.—The crosscut from the north gangway 350 foot level, extended 8 feet. Rock very hard.

GRAND PRIZE.—400-foot level: East drift on the north vein extended 11 feet, face being all in vein matter. Face of west crosscut from south drift has been advanced 8 feet, cutting seams of quartz. Work has been suspended on the 500-foot level.

BELLE ISLE.—No. 1 north drift from Navajo line crosscut, 250-foot level, extended 14 feet. South drift at the north end, same level, extended 7 feet, showing some good ore. South drift from the No. 2 crosscut, 350-foot level, extended 13 feet; total ledge 58 feet. The face is now in quartz.

NORTH BELLE ISLE.—North gangway, 600-foot level, has been extended 22 feet. The face is in large blocky ground showing faces of spar and iron. West crosscut, same level, is in 58 feet, showing vein matter most of the distance.

NORTH COMMONWEALTH.—Second level: Joint

crosscut has advanced 12 feet, cutting seams of spar. No. 1 south drift extended 5 feet. Chute has been put up in No. 1 upraise, and work resumed in the raise. No. 2 south drift has been started 100 feet east of No. 1. It was started on ore and looks favorable.

COMMONWEALTH.—First level: East drift on Dolan vein extended 3 feet, total 200 feet. The ore in face of drift is small, and work has been suspended until crosscuts can be run to prospect the vein; crosscuts now in 20 feet. No. 2 upraise from joint crosscut extended upward 26 feet in vein formation. Two hundred and eighty tons of ore have been sent to the concentrator; 105 tons concentrates, dry weight, on hand.

DEL MONTE has sent 250 tons concentrating ore to the concentrator.

Tybo District.

TO PURCHASE.—Belmont *Courier*, May 5: It is said that capitalists will soon purchase the 2-G and Dimick mining properties at Tybo. With the judicious expenditure of money these properties can be made in pay handsomely, as there is plenty of good ore in sight in the 2-G and Alta mines. We hope to soon see Tybo a prosperous and lively mining camp again.

Yellow Pine District.

A LEAD MINE.—Pioche *Record*, May 3: Dick Huddleston having spent the winter months in prospecting through the southern section of the county, is sanguine of having made some valuable locations, among which may be mentioned the old Potosi mine in Timber mountain. Dick's copartners in the claim are Chas. Lytle, Geo. Warren, E. A. Shear, Oliver Rose and J. L. Hayes. The mine was located a good many years ago and was worked at various times by different parties. The mine is a little mountain of almost pure lead, but as it carries little silver it will not pay to ship any distance. The advent of a railroad through that section, however, will make it one of the greatest bullion-producers on the coast. The ore on the dumps is variously estimated at from 200,000 to 300,000 tons.

ARIZONA.

ORE.—Mohave *Miner*, May 10: F. F. Brawn has sent several sacks of ore to the Kingman Sampling Works, for sampling from a new strike in the Gold Basin. J. H. Farlee has high hope that he has struck an ore-bearing ledge in the Grand Canyon, near Diamond Creek. J. D. Smiley came in on Wednesday from his General Harrison mine in Todd Basin. The main tunnel is in 140 feet, and the ore is looking well. H. H. Thomas has twelve men at work on the Brown mine, at Stockton Hill. This property is proving better than ever anticipated. A boarding-house has been erected on the mine. The following lots of ore have been received at the Kingman Sampling Works during the week: Unclapper & Finegan, from the Homestake mine, at Mineral Park, 18 or 20 tons; E. F. Thompson, from the Empire, 15 tons; J. K. Mackenzie, from the Cupel, 30 tons; Rogers & Canyons, from the Tintic, about one carload; H. S. Thomas and J. A. Platt, from the Brown, Stockton Hill, 23 tons. A number of smaller lots were run through the Sampling Works. The tunnel connection with the main workings of the Little Boy mine was made last week. A large body of water was in the mine, which suddenly pushed the three-foot wall of rock, which held it back, and which it was intended to drill, and let the water out slowly, and carried everything in the tunnel and at the mouth before it. Two men were in the tunnel at the time, and they had a narrow escape from drowning. Supt. Conard is delighted with the completion of the tunnel work.

COLORADO.

THE MONTE CRISTO.—Aspen *Times*, May 9: Col. Morgan, manager of the Monte Cristo, has made a contract with Hillery & Thomas to bring down from 10 to 20 tons of ore per day from the property. The mine, he says, now shows a solid breast of ore seven feet thick. An average sample taken Tuesday night ran 36.8 ounces silver and 26 per cent lead. The colonel believes that he can get it treated for \$3.50 per ton. This mineral was opened in drifting from the old Lake tunnel, and the discovery seems to bear out the theory that the contact there rapidly increases in value as it dips into the earth. The developments, however, are yet too young to base any estimates on.

THE ASPEN.—There has been some talk on the streets for a few days past of a lay-off on the Aspen mine, and some folks have found in the report an omen of evil. The fears of such are entirely groundless; the mine has not closed down, neither has it laid off any considerable number of men. It became necessary to reline the shaft, and this necessitated the temporary suspension of hoisting operations. The work will be finished in two or three days and regular shipments will be resumed.

DAKOTA.

CUSTER'S PEAK.—Deadwood *Pioneer*, May 6: Prospectors have found refractory ore similar to that of Ruby at the foot of Custer's Peak. The east side of the bottom of the mountain has been completely taken up by lectors.

RUBY.—This mining district never had a better outlook than at the present time. Prospectors are hard at work seeking for the refractory ore with which this district abounds. At present there are more private claims being worked than properties owned by stock companies. The Ross-Hannibal has considerable ore on its dump taken from the tunnel being driven to strike the old shaft in which rich silver ore was found, but abandoned on account of water. Two shifts are working. Ernest May is working a force of men on the Mark Twain. The Troy Co. is drifting from the bottom of the 50-foot shaft sunk last year. David Arnold has the contract and is working two shifts. The Thanksgiving will resume development work some time this month, negotiations being made with parties to thoroughly develop the property, which consists of five claims. Three new ore chutes have been recently struck in the well-known Hardscrabble mine. The ore is high grade.

IDAHO.

YREKA DISTRICT.—Wardner *News*, May 3: Wm. Merry, George Gardner and Alonzo Shankland are

busily employed developing the Silver Queen lode, one of the claims of the Silver King M. Co. on Government gulch. They have been engaged in putting the main tunnel in shape and are now opening up a slope of good concentrating ore in one of the upper levels.

BIG CREEK.—Frank Prichard and others are engaged in extending their tunnel on the Myrta May lode, located on the north side of South Fork near Miner's Cabin. Considerable work was done on this claim during the early days of the camp, and a resumption of operations shows confidence in the property.

EVOLUTION DISTRICT.—H. N. Freeman and Fred Shoeder keep steadily developing their claim on Two Mile gulch, known as the Midnight. Their tunnel is in 80 feet with very good indications showing gray copper and galena.

ROSEBUD GULCH.—Fred Franks, Chas. Mead and A. L. Senfield have commenced running a second tunnel on the Knickerbocker, an extension of the Cour d'Alene Nellie.

WARDNER RAILROAD.—A party of engineers commenced on Thursday a survey for the projected railroad down Milo gulch. They started at a point adjoining the concentrator of the Bunker Hill and Sullivan mines, and continued their line down the west side of the gulch.

MONTANA.

THE ANACONDA OPENING.—*Inter-Mountain*, May 9: The work of reopening the Anaconda and St. Lawrence mines was formally started last night. The bulkheads had been taken out the Sunday before and the work of exploring that portion of the mine above water was undertaken. The fact of this being done was kept carefully a secret for fear of disappointment, the manager says, but there were too many interested and the news was soon public property. It also soon became known that the mines had been but little injured by flood-fire, and when it was made public that the pumps were drawing off the water and a large force of men was working above the 400, the supposition generally was that ore would soon begin to issue from these great properties. When these mines were first entered the water was found to have risen within 30 feet of the 600-foot level of the Anaconda and the St. Lawrence. Above these points every level on both sides has been thoroughly explored with most gratifying results. Not only was no fire discovered, but it was learned that the damage by fire and water has been trifling compared with what had been expected. The magnificent Anaconda mine is in nearly as fine condition as it ever was. There has never been any fire in that mine and a thorough exploration has shown that there have been no caves. As to the St. Lawrence, where the fire actually was, the damage is trifling compared with what might be reasonably expected. The only cave-in is on the 500-foot level and that is of small importance. Burned timbers must of course be replaced, but Supt. Carroll gave it as his opinion that the sum of \$5000 would repair the damage and place both mines in good condition. Of course the loss to the company by the closing of the mines during the past 5½ months cannot be easily calculated, but the direct loss, it is believed, can be covered by the sum mentioned. It is about two months since the pouring of water into the great mines began. The water was not turned down the shafts, but was directed chiefly to the 200-foot level of the St. Lawrence by the north shaft, spreading itself from this point. The process was most successful, extinguishing a fire that might have burned for years. It is thought a month will be amply sufficient to repair all damages and place these in as good condition as they were before the fire.

NEW MEXICO.

ANOTHER RICH STRIKE.—*Southwest Sentinel*, May 6: A rich strike was made last week by Ben Hobson in one of the claims belonging to the Hobson group of mines at Blackhawk. The strike uncovered a body of fine ore some of which will run \$5 per pound. The ore is free milling and carries native silver in large flakes, which can be extracted from the rock with a knife. Nat Scarlett, James Corbin, J. J. Bell and the other owners of the Pennsylvania and Center mines at Carlisle have leased the properties to John A. Miller, Miller taking a royalty of 25 per cent, the owners getting 75 per cent. Since our last issue Mr. Miller obtained a lease from the Carlisle company to 20 stamps of the mill. The company puts the mill in good running order.

STRUCK IT RICH.—Jack McNeill and Vance Nicholson have taken a lease on the Jim Crow mine at Carlisle. They ran a crosscut from the bottom of the shaft and struck a breast of three feet of solid ore which averages, across the lead, \$250 in gold and \$114 in silver. This breast of ore was found at a depth of 60 feet. The ore is being sacked preparatory to shipment. John Eply and R. T. Bailey are the fortunate owners. The Imperial is the west extension of the Jim Crow and in every respect like that mine, except that so large and rich an ore body has not been found. The owners intend sinking on the end of the claim which connects with the Jim Crow a shaft 25 feet deep and then drift, where they expect to find the same class and as large a body of ore as exposed in the Jim Crow.

OREGON.

REDUCTION WORKS.—Baker City *Democrat*, May 5: Yesterday evening E. L. Giroux, manager of the Giroux amalgamating works, foundry and machine shop to be located in Baker City, arrived from Portland, and his trip here is to make all final arrangements for the erection of the plant at the earliest possible day. The company that he represents and the citizens of Baker City have come to a definite and positive understanding and contracts have been signed. The \$25,000 subscribed by the people to stock in the enterprise has been placed at the disposal of the company and now all that remains to be done is for the company to make a selection of the site upon which to erect the plant, and as the company has three different locations under consideration this matter is only the work of short deliberation. Mr. Giroux intends, as early as possible, to go East, where he will select the proper machinery for the foundry and machine shops. Reduction works in Baker City at this time means a wonderful impetus to the development of the mines not only of this county, but of Grant and Union tributary to this city.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING MAY 6, 1890.

- 427,149.—APPARATUS FOR SUBMARINE EXPLORATION—Calvin Brown, S. F.
427,306.—DEVICE FOR MEASURING DISTANCES—H. Eruken, Ft. Lowell, A. T.
427,168.—BED-BOTTOM AND BRACE—P. G. Gesford, Jr., Napa, Cal.
427,232.—WAND-TRUCK—J. Harps, San Fernando, Cal.
427,185.—STREET-SWEEPING MACHINE—S. F. McMill, S. F.
427,099.—CORK-PULLER—E. D. Middleknapf, Stockton, Cal.
427,112.—FRUIT-GATHERER—H. D. Reaves, Montecito, Cal.
427,115.—HOOF-TRIMMING TOOL—A. M. Roberts, Mitchell, Ogn.
427,197.—CARBURETOR—W. H. Shannon, Stockton, Cal.
427,198.—DRIER—E. R. Shaw, S. F.
427,275.—DENTAL ELEVATOR—Daniel Siddall, The Dalles, Ogn.
427,276.—HARROW—W. T. Sterling, Enterprise, Ogn.
427,204.—TELEPHONE—J. C. H. Stut, S. F.
427,205.—CABLE TIGHTENER FOR CABLE RAILWAYS—J. C. H. Stut, S. F.
427,138.—ELECTRIC CONNECTOR FOR BRAKE HOSE—Wamsley & McIntosh, Walla Walla, Wash.
427,286.—VEHICLE WHEEL—W. S. Wilson, Tombstone, A. T.

The following brief list by telegraph, for May 13, will appear more complete on receipt of mail advice:

- California—James E. Beach, Router, thrashing machine; Henry B. Cory (assignor of one-half to A. W. Eames) Los Angeles, monkey wrench; Ernest H. Cheerton, Los Angeles, waffle-iron handle; Lewis M. Cement, Oakland, and C. C. Watres and L. Heynemann, S. F., turntable; Thomas J. Daniels (assignor to Perry & Co.) S. F., machine for sewing up the mouths of filled bags; Simon J. Ford, Placerville, car-coupling; Hugo Gornall, S. F., combined yarn winder, darrer and spool-stand; William C. Hamilton, San Jose, fruit-grader; Henry O. Hoper, S. F., type-writing machine attachment; Frank A. Huntington, S. F., crushing-mill; John Manson, North Bloomfield, stump extractor; William H. Masser, Los Angeles, metallurgical apparatus; James W. Mitchell, S. F., incrustation preventive; William R. Quinn, Pinole, mixer for explosives; Mathurin G. Robineau, S. F., street-sweeping machine; Joseph L. Stillman, Fresno, non-conductor covering; Haden Swain, S. F., delivery or fly-finger for printing machines. Oregon—William M. Chamberlain, Sheffield, Ala., H. B. Smith, Massachusetts, and R. L. Warner, Portland, vehicle wrench. Washington—Joseph Ridby and G. W. Reed, Seattle, car-coupling.

NOTES.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

DRIER.—Eiton R. Shaw, assignor to Mosher, Shaw and Craig, S. F. No. 427,198. Dated May 6, 1890. This is a drier or evaporator for fruit, vegetables, etc. A difficulty in this class of driers is a failure to dry uniformly in all parts of the drier, a necessary operation to enable the material under treatment to emerge in as near a uniform degree of desiccation as will insure its proper keeping qualities, color and flavor. This drier is intended to overcome this difficulty as well as to enable the operators to handle their work with facility and profit.

ADJUSTABLE BED-BOTTOM AND BRACE.—Preston G. Gesford, Napa. No. 427,168. Dated May 6, 1890. This invention consists of a series of diagonally disposed bars crossing each other, and slotted so as to be adjustable to each other and to the sides of the bed to which they are to be applied as to fit within any given size, and to serve as a brace to stiffen the bed. This will prevent the bed from twisting and getting out of place when being moved about the floor.

CABLE-TIGHTENER FOR CABLE RAILWAYS.—J. C. H. Stut, S. F. No. 427,205. Dated May 6, 1890. This invention relates generally to the class of cable railways. It consists essentially in a means whereby the slack cables of a cable system can be drawn tight while the cable is in motion. Though the invention may be applicable to different arrangements of cables, it is applicable especially to that known as the "windlass system" in which the driving sheave has a certain number of grooves, say five or six, and the follower-sheave one groove less than the driving-sheave, so that the incoming cable goes around the driving-sheave first, and thence over the follower-sheave, and from this back and forth between the two sheaves, and finally leads off from the driving-sheave in the engine-house to the mine under the street.

TELEPHONE.—J. C. H. Stut, S. F. No. 427,204. Dated May 6, 1890. The object of this invention is to make the telephone small and inexpensive, producing a large volume of sound and greater variations in the undulations of both primary and secondary currents, so that conversation may be carried on over a greater distance, and inductions, leaks and resistances better overcome. It consists in the employment of a confined body of air, oxygen or other gas, which combines with the carbon when a current of electricity passes between the contacts, thereby increasing the temperature

and decreasing the resistance between the contact points as the vibrations increase the pressure, and decreasing the resistance as the pressure decreases. This is effected by the employment of an airtight case, within which the operating mechanism of the telephone is contained, and in which the diaphragm forms a portion of one side. Within this case is contained air or oxygen under pressure, so that a large number of atoms of oxygen per unit of area are interposed between the contacts. The variation of resistance to the electric current takes place in unison and harmony with the sound-waves striking the diaphragm, the sound-waves being thus transformed into heat-waves of varying temperature by the agency of the electric current between the contacts. The invention further consists of certain details of construction.

STREET SWEEPING MACHINE.—Samuel F. McMill, S. F. No. 427,185. Dated May 6, 1890. This machine involves the employment of brushes and elevators. Its novelty lies mainly in the number and relative location of the elevators. The brushes are located at the rear of the machine. They sweep the dirt into the first elevator, which carries it forwardly and upwardly. It is then delivered upon a cross-carrier, which conveys it to the side of the machine and discharges it into a second elevator, which carries it upwardly and backwardly along the side to the rear of the machine, and delivers it by a suitable spout into the dump-wagon which drives up alongside. Thus a sufficient elevation is gained and the most convenient point of dumping is had. Another point of novelty lies in a peculiar adjustable gutter brush adapted to automatically conform itself to the inequalities of the curb and gutter. The whole machine is simple, compact and light running.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

SACRAMENTO ELECTRICAL CONSTRUCTION CO., May 10. Capital stock, \$10,000,000. Directors—W. Gambs, N. B. Lazard, G. W. Daywalt, W. R. Lett and W. B. Reynolds.
CALIFORNIA GUILD, May 10. Object, to deal in real estate. Capital stock, \$10,000,000. Directors—Isaac Trumbo, Alexander Badlam, A. W. Robinson, Richard K. Allen and C. D. Allen.

REVENGE G. M. CO., May 10. Location, Siskiyou Co. Capital stock, \$1,000,000. Directors—Jabez Howes, J. W. Pew, E. L. Campbell, R. S. Wheeler and R. L. Apple.

SILVERADO M. CO., May 10. Location, Napa Co. Capital stock, \$10,000,000. Directors—Isaac Trumbo, Alexander Badlam, Andrew J. Young, Daniel Patten and M. F. Patten.

CLINTON CONS. M. CO., May 10. Capital stock, \$3,000,000. Directors—Robert Stevenson, H. William Dunvan, D. Guttman, J. F. Holling and F. T. Bennett.

SAN JOSE CONSTRUCTION CO., May 13. Capital stock, \$1,000,000. Directors—W. B. Hickok, George M. Lee, F. B. Pritchard, George M. Chamberlain and J. I. Scoville.

STOCKTON ELECTRIC CONSTRUCTION CO., May 13. Capital stock, \$1,000,000. Directors—F. E. Birge, T. E. Curran, A. Humphrey, G. A. Koch and J. J. Scoville.

BACON LAND AND IMPROVEMENT CO., May 10. Capital stock, \$500,000. Directors—H. D. Bacon, F. P. Byron, F. S. Page, Charles M. Berlin and F. A. Berlin.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none out worthy men.

- J. C. HOAG—San Francisco.
R. G. BAILEY—San Francisco.
EDWIN TILDEN—San Francisco.
SAMUEL CLIFF—San Luis Obispo Co.
O. J. WADE—San Bernardino Co.
W. W. THORNTON—Los Angeles and Orange Co's.
E. B. TAFT—San Joaquin Co.
JOHN E. HILL—San Diego Co.
E. H. SCHAFER—Calaveras Co.
FRANK S. CHAPIN—Colusa and Tehama Co's.
W. B. FROST—Merced and Stanislaus Co's.
Geo. Wilson—Sacramento Co.
T. M. STACRUS—Sierra Co.
H. KELLEY—Modoc Co.
H. B. PARKER—Del Norte Co.
W. H. HILLGARY—Oregon.
R. G. PARSONS—Oregon.
R. G. HUSTON—Montana.

Successful Patent Solicitors.

As Dewey & Co. have been in the patent soliciting business on this Coast now for so many years, the firm's name is a well-known one. Another reason for its popularity is that a great proportion of the Pacific Coast patents issued by the Government have been procured through their agency. They are, therefore, well and thoroughly posted on the needs of the progressive industrial classes of this Coast. They are the best posted firm on what has been done in all branches of industry, and are able to judge of what is new and patentable. In this they have a great advantage, which is of practical dollar and cent value to their clients. That this is understood and appreciated, is evidenced by the number of patents issued through their SCIENTIFIC PRESS Patent Agency (S. F.) from week to week and year to year.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, term of subscription, and give it their own patronage, and as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscriptions, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

MECHANICAL PROGRESS.

Russian Sheet Iron.

Some improvements appear to have been patented lately in the East for the manufacture of planished or "Russian iron."

The making of Russian sheet iron was long a mystery. It is pretty fairly well understood in this country now, though. Probably American manufacturers were never so baffled at anything as they have been for years past in trying to find out how planished sheet iron, such as locomotives are covered with, was manufactured in certain iron works in the realms governed by the great White Bear. They sent spies abroad, furnished with plenty of money for carrying on researches. They went—if reports are true—themselves. They tried every kind of art known to commercial diplomacy, but all in vain. No one could find out how Russian iron was made. America, for once, had to confess herself beaten in a great technological process.

Workingmen, foremen, and upper mechanics were hitten with the craze. Numbers of such—if the stories current in iron-making circles are to be trusted—turned the whole of their little possessions into cash and went off for a sojourn in the Muscovy to try and ferret out the much- coveted secret. Howsoever craftily they went about their business, howsoever well they tried to disguise themselves, they invariably returned home very little wiser than they went.

At length, however, by dint of various odd pieces of information that had been learned from those who had been abroad in the quest, and by dint of exhaustive researches made on the subject in scientific laboratories, a clue began to be arrived at in the matter. There are people, well informed, to be found, it is true, who persist that the true secret is still confined to Russia. This is a mistake, though it is true that a great deal of Russian iron is still imported. Nevertheless, the process is known.

Some interest will perhaps be felt by our readers in a short account of it.

The aim of the process may be said to be the removal of the coating of oxide of iron that invariably forms over the surface of all iron sheets, and the preservation of the true iron surface in a way calculated to withstand air and moisture. The process itself is carried out by reheating sheets, of Number One material, with a layer of charcoal that has been shaken over them from a linen bag. The action of the charcoal, or carbon, is, of course, to combine with the oxygen in the oxide and reduce the latter to metallic iron.

A species of Russian iron can be made in this way. Still it is only a species—only a *pseudo* kind of thing. Now comes the secret as to making the legitimate article.

First of all, it may be said that the above is only an account of the most salient chemical points in the process. Here are some of the mechanical details. They are mentioned for those who may take some special interest in reading them. According to one Michael Neolawich—a refugee who visited some iron works recently at Pittsburgh and professed himself familiar with, at least, the mechanical department in dressing Russian sheets, refined iron sheets are taken in making Russian iron. This is hammered under a tilt hammer into narrow slabs, calculated to produce a sheet of iron 56x28 inches, weighing, when finished, from 6 to 12 pounds. These slabs are put into the reheating furnaces, heated to a red heat and rolled down in three operations to something like a sheet. This must again be hammered to reduce its thickness, and to receive the gloss or polish. A number of these sheets, having been again heated to a red heat, have charcoal, powdered into as fine a powder as possible, shaken between them from the bottom of a linen bag. The pile then receives a covering and a bottom in the shape of a sheet of thicker iron, and is placed under a heavy hammer; the bundle is grasped with tongs by two men, and is pushed backward and forward by them, so that every part may be well hammered. So soon as the redness goes off, the sheets are finished, so far as that part of the operation goes. Now they have received some of the polish. They are heated and treated differently in this respect, but instead of having the layer of powdered charcoal placed between them, each two red-hot sheets have a cold-finished sheet put between them and again hammered. After this process they are finished, so far as the thickness and gloss goes. The sheets are thrown down separately to cool, after which they are taken to the shears, placed on a frame of the proper size and trimmed. After being weighed they are rolled into flats, seconds and thirds, according to their polish and freedom from spots and flaws. A first-class sheet must be like a mirror, without a spot on it, the same as can be seen on the jacket of a locomotive boiler. Four heats are required to finish the sheets. Besides the finished sheet, a quantity of what are called red sheets are made, which are not polished and do not undergo the last operation.

The main chemical secret as to making the true, bona fide Russian article, has been protected recently by American letters-patent. Therefore there cannot be anything, as it were, out of Court, in mentioning it. The true secret lies in using lead in conjunction with the charcoal. This tends to oxidize in the heating furnace. To get oxygen it reduces the oxide of iron. Afterward the plumbic oxide, combined

with some metallic lead, enters the pores of the iron and produces the body which it was desired to produce. Of course, there are many details that have to be observed in applying the lead. It has to be reduced to a very thin condition for one thing. The details, though, need not be gone into here. What we have in the main to insist on is that Americans have found out, according to the most reliable information we can obtain, how at length to accomplish what has baffled American metallurgists so long.

Undoubtedly there is still a great deal of "American-Russian iron"—a second-rate article—in the market. Every machinist and working mechanic knows that. He knows it by having to deal with it constantly. It is used not only for locomotives, but for furnaces, stoves and what not. Still this does not go to invalidate what we say. The real thing is expensive to produce. From that, and some other causes, the imported article is enabled to hold its own pretty well. The main point to remember, though, is that home producers are in a position to manufacture first-class planished iron, if commercial and other reasons should cause them to see fit to do so.—*Western Machinist*.

Improvement in Utilizing Iron Sands.

Late information from New Zealand states that an improved method of fluxing the iron sand which abounds on the west coast there has been discovered. Every one who is acquainted with the commercial resources of New Zealand is aware that it possesses on the coast immense stores of iron sand of remarkable richness. Hitherto no economical method of securing a flux of that sand has been discovered, although large quantities of these sands have been worked even at the great cost encountered in consequence of the superior quality of the iron thus obtained. Experiments of this kind have also been made in this city, near which, along the Pacific Coast line, large quantities of iron sand are known to exist.

The *British Manufacturer*, in noticing this alleged discovery, says:

Authorities agree that if the valuable mineral sand there found could be brought into commercial use, New Zealand would at once become one of the most important iron-producing countries in the world. It is not surprising, therefore, that the announcement of the alleged discovery has created a very great sensation.

The statement is that Messrs. Minall & Jones have discovered a process which they are, of course, keeping secret until it has been protected by patent. Some hesitation is evinced in accepting the truth of this report. That a flux is in existence is well known. That, however, is not sufficient; it must be economical, and the accounts received from New Zealand give no indications of the cost at which this sand can be used. It is not a question of practicability but of expense, and what is required to make New Zealand an important iron center is that an economical flux should be discovered.

A short time ago something was heard in London of a company which was to test the petroleum deposits and the iron sand of New Zealand, but it was subsequently stated that so far no economical available means of dealing with the iron sand had been discovered. Therefore, until there is clear evidence that some one cannot only deal with the iron sand, but deal with it economically, all reports, as the one now to hand, will be received here with a good deal of skepticism.

AN ALARM FOR HOT BEARINGS.—Christian Agerskov of Copenhagen, Denmark, has devised an alarm for hot bearings, which it is claimed will be both effective and useful. The idea embodied is to arrange an explosive, in association with certain chemicals, so that a certain degree of heat will cause the explosion and warning before the heat reaches a destructive stage. A small sheet of sheet-metal—something like a cartridge-shell—is filled about halfway to the open top of the explosive. A paraffine globular capsule, hollow inside, is filled with sulphuric acid and sealed. This globe is laid on top of the explosive, and a mixture of borate of potash and sugar is filled in all around it; then a stopper or plug of cork or rubber is put in, sealing the cartridge. A hole is drilled in the box or bearing and the cartridge set in. Should the bearing run dry, the heat will melt the paraffine capsule, letting the sulphuric acid come in contact with the chlorate and sugar mixture, which will immediately explode the cartridge, causing a loud detonation and a light and volume of smoke, so that attention is immediately called to the condition of the bearing. This invention, it is claimed, has wonderful merit, and has been patented in many of the European countries.

COMPRESSING LIQUID STEEL.—Some time since a French physicist discovered that steel was strengthened by being compressed while in a liquid condition, and Messrs. Kropp of Essen are now producing sound steel ingots under pressure. The pressure is applied in a very novel fashion. The steel is poured into the ingot molds, which are then hermetically sealed, and liquid carbonic acid is introduced into the top of the mold. The heat of the molten metal evaporates the acid, and the confined gas exerts a very high pressure upon the metal.

SCIENTIFIC PROGRESS.

The Fear of Death.

The first element in the fear of death is an idea of physical pain. It is natural that this should be connected with the idea of death, for in many cases intense pain precedes death. But the two are far from being invariable accompaniments. Intense pain may be followed by life as well as by death. We must distinguish between the fear of pain and the fear of death. Death may be painless. Pain and death do not stand in the relation of cause and effect. One is sometimes the preceding condition of the other, but not a cause. Besides this, the fact must be recognized that death is but a point of time—an instant, a second—and that neither the preliminary process nor the immediate dissolution is constantly attended by pain. Even the worst death may be welcomed as bringing a release from suffering. So let us thrust aside the notion of pain and keep carefully separated from it the fear of death.

Second, is the idea of the mystery of the change. Let us keep closely in mind what death is—it is an instantaneous change. One moment was life, the next was not life. One instant was the exercise of vital energies, the next their total stoppage. One second, one was with this world; the next, he is gone from it forever. This mystery, unlike pain, is inseparable from death and the idea of death. One cannot think of death and not think of the mystery of the change and the loneliness of it. Every one has to encounter it for and by himself.

Third, is the idea of that which is beyond death. This idea also is inseparable from the contemplation of the change. Whether one believes in a life beyond the grave or in annihilation, makes no difference. There is something beyond, and the dread of that mystery

"Puzzles the will.
And makes us rather bear those ills we have
Than fly to others that we know not of."

All these three ideas are connected with death; and yet the change is one that is being encountered every day. There are few who have not seen one die. It is a matter of general knowledge that the number of death beds where the one who was experiencing the change has been unnerved is very small. The dying one is not moved by his loneliness. He does not weep at the separation. What grief he does manifest is more for those who are left than for himself who is going. Whether a weakened vitality hunts his sensibilities, or whether he is prepared for the last great change by unusual strength, matters not. There is the fact, when the dying man comes to die, at the real and very decisive moment he has no fear of death.

PERILS OF SCIENTIFIC BALLOONING.—THE HIGHEST ASCENT.—The most remarkable of Mr. Gaisber's balloon ascents was that undertaken on Sept. 5, 1862, from Wolverhampton. The intention was to reach the greatest height possible. The balloon left the ground at a few minutes past one o'clock, and at the end of 45 minutes a height of five miles was reached. Mr. Gaisber began to grow faint on account of the rarefaction of the air. When half a mile more had been mounted, he lost the use of his hands and limbs, the temperature being 5° Fahr., and the height of the barometer only 9½ inches. A few moments afterward he fell back insensible in the car. His companion, Mr. Coxwell, who had been employed as aerostat, then attempted to stop the ascent by pulling the valve-rope; but this had become twisted on account of the rotary motion of the balloon. It was necessary to climb up into the rigging to disentangle it. On attempting to come down, he found his hands frozen and insensibility beginning to creep over him. Placing his arms on the ring, he dropped down into the car. After several ineffectual efforts he succeeded in catching the valve-rope with his teeth, and by dipping his head a few times he caused the escape of enough gas to make the balloon take a decided turn downward. Mr. Gaisber soon recovered and resumed his observations upon the instruments. During the few moments before he became insensible, the balloon had been rising at the rate of 1000 feet per minute. Thirteen minutes of insensibility followed, and the rate of descent was found to be 2000 feet per minute. A minimum thermometer indicated that the lowest temperature attained was -11.9° Fahr., and Mr. Coxwell observed the lowest barometer to be 7 inches. These data warranted the conclusion that the maximum elevation had been 37,000 feet, or 7 miles. The first 3 miles of descent were accomplished in 9 minutes. The balloon was then checked by throwing out ballast, but the ground was reached in safety, about 100 minutes after the departure from Wolverhampton.—*London Iron*.

EARLY GLOBES.—Atlas of Libya is said to have discovered the use of globes, and Greek and Roman writers made several allusions to them. The celestial preceded the terrestrial globe by many centuries. The oldest globe in existence, dating from 1070, is now at Florence, and though less than eight inches in diameter, gives 1015 stars. Five metallic globes made by the Arabian astronomers in the thirteenth century are still preserved, one belonging to the British Royal Astronomical Society. The terrestrial globe appears to date from 1492. The first map on which America appears was

found among the papers of Leonardo da Vinci at Windsor Castle, and as it is drawn in eight gores, it seems to have been intended as a globe. The next terrestrial globe of interest was that completed by Mercator in 1541, having a diameter of 16 inches. Various others succeeded, until in 1592 Mollineux constructed several enlarged and improved globes 26 inches in diameter, differing but little from modern globes except in geography. One of these still remains in the library of the Middle Temple, London. About the time Mollineux's work was done, Hues' Treatise on the Globes was published in Latin, and quickly went through many editions and translations. It has just been reprinted in English.

THE ANCIENT AND THE MODERN FOOT.—A noticeable thing about the statues found in our museums of art, supposed to represent the perfect figures of ancient men and women, is the apparently disproportionate size of their feet. We moderns are apt to pronounce them too large, particularly those of the women. It will be found, however, that for symmetrical perfection these feet could not be better. A Greek sculptor would not think of such a thing as putting a 9-inch foot on a 5½-foot woman. The types for these classical marble figures were taken from the most perfect forms of living persons. Unquestionably the human foot, as represented by these old sculptors, was larger than the modern one; and in fact the primitive foot of all people of whom we have any record, either in printing or statuary, was considerably larger than the restricted foot of modern times. The masculine foot, forming an approximate average of four different countries, was about 12 inches long; this would require at least a No. 12 or 12½ shoe to cover it comfortably. The average masculine foot to-day is easily fitted with a No. 8½ shoe, and is therefore not above 10 7/16 of an inch. Now, by the old empirical rule of proportion, a man 5 feet 9 inches in height should have a foot 11½ inches long, or one-sixth his height. It was of no great consequence what size sandals he wore, but he would have required a modern shoe of at least a No. 10½ for a minimum fit, or a No. 11 for real comfort. For women, allowing for the difference in the relative size of the two sexes, which was about the same then as now, a woman of 5 feet 3 inches in height would have had a foot ten inches long, requiring a modern shoe—it ought to be spoken only in a whisper—No. 6 as the most comfortable for that foot, or a No. 5½ as the limit of torture. The reason for the difference between the old classical foot and the modern one is obvious—restriction is what has done it.

SIGNING A CHECK BY ELECTRICITY.—One of the marvels of electricity, and one of the most striking of the Edison exhibits at the Paris Exposition, was the little instrument which enables the operator to sign a check 100 miles distant. The writing to be transmitted is impressed on soft paper with an ordinary stylus. This is mounted on a cylinder, which, as it revolves, "makes and breaks" the electric current by means of the varying indentations on the paper. At the receiving end of the wire a similar cylinder, moving in accurate synchronism with the other, receives the current on a chemically prepared paper, on which it transcribes the signatures in black letters on a white ground.

INDIA RUBBER.—Henry M. Stanley, in an interview with a New York *Herald* correspondent, said that the Aruwimi forest, which belongs to the Congo Free State, was enormously richer in everything, especially in rubber trees, than the Amazon forests. This section of Africa, he declared, would be the rubber reservoir of the world. This is certainly encouraging for American wire manufacturers who use rubber in their insulation. Such a statement from so reliable an authority ought to have a salutary effect on the market price of rubber.

LIQUID MASSES.—Herr W. Spring has found that the free surface of a liquid is chemically more active than its internal mass. To show this, he puts into dilute hydrochloric acid a slab of marble slightly thickened at its upper end so as to form a resting-place for bubbles; where the bubbles gather, the marble is very rapidly eaten through. So also on blowing air on any spot; and so on putting a slab partly within and partly outside the liquid.

HUMBOLDT IN FAULT.—The expedition of the Philadelphia Academy of Natural Sciences to Mexico has resulted in exploding some very erroneous ideas in regard to the height of Mexican volcanoes. They found Popocatepetl to be nearly 3000 feet lower than the measurements of Humboldt. The total height of the mountain, making allowance for minor barometric corrections, is 14,700 feet above the sea level.

A NEW CHEMICAL MANURE.—M. Ville, a professor of chemistry in Paris, states that he has discovered a new chemical manure—intense and almost miraculous in its effects on the vine. It consists of a mixture of phosphate of lime, carbonate of potash, and sulphate of lime, which, if placed round vine-growths, will enable them to defy the onslaughts of the phylloxera.

OZONE.—Olszewski, the Russian physicist, has succeeded in liquefying sufficient ozone to determine the boiling point, which is 159 Fahrenheit. The liquid ozone is dark-blue in color, and is nearly opaque in a layer of a tenth of an inch thick.

GOOD HEALTH.

Medicinal Value of Olive Oil for Snake-Bites, Etc.

In our issue of April 12th we gave some account of the treatment of snake-bite by the use of olive oil as practiced by C. R. Earley, M. D., of Ridgeway, Pa. That gentleman having received that copy of our paper containing the article, writes us as follows:

"The copy of your journal containing a statement of my treatment of snake-bite by the use of olive oil came to hand. Please accept my thanks for your kindness in sending me a copy. In your statement a *teaspoonful* is given as the dose. It should be given in *tablespoonful* doses, and not less, and repeated every few minutes till the bowels are freely moved. A half-dozen doses are generally all that is required. The wound should also at once be scarified and packed with the olive oil.

"Olive oil is also a sure remedy for gall-stones if given freely. We have used it freely in practice and it has proved entirely satisfactory; we use none other than the pure virgin oil. We have it imported in original packages from the manufacturers.

"In hemorrhoids, or piles, of long standing, we use it with wine by the mouth and as an injection combined with chloride of sodium, boracic acid or sulpho-carbide of sodium and laudanum. We always use it in snake-bites and it has never failed. (My practice has been very extensive.) I have never directed any other treatment. The inhabitants of localities where rattlesnakes and copperheads are found always keep a good supply of olive oil in their houses, and when bitten never call a doctor, but use olive oil freely, which in every case gives full and complete relief.

"Olive oil has been used for various medicinal purposes in all ages. It was mentioned by Pomet, chief druggist to Louis XIV, to which he adds his father's observation, fourth edition, 1748. He says: 'It is a natural balsam for the cure of wounds, being heated up with wine. It is of wine and this oil that the Samaritan balsam, with which the Good Samaritan in the Gospel healed the wounds of the traveler, was made, and it is a medicine in use at this day.' It was and is now freely used internally in many cases with marked success."

[The above letter is especially interesting and valuable to us here in California, where the production of pure olive oil is so promising and thriving a young industry.—EDS. PRESS.]

Health Commandments.

1. Thou shalt have no other food than at meal-time.
2. Thou shalt not make unto thee any pies or put into pastry the likeness of anything that is in the heavens above or in the waters under the earth. Thou shalt not fall to eating it or trying to digest it. For the dyspepsia will be visited upon the children to the third and fourth generation of them that eat pie, and long life and vigor upon those that live prudently and keep the law of health.
3. Remember thy bread to make it well; for he will not be kept sound that eateth his bread as dough.
4. Thou shalt not indulge sorrow or horror anxiety in vain.
5. Six days shalt thou wash and keep thyself clean, and the seventh thou shalt take a great bath, thou, and thy son, and thy maid-servant, and the stranger that is within thy gates. For in six days man sweats and gathers filth and bacteria enough for disease; wherefore the Lord has blessed this bath-time and hallowed it.
6. Remember thy sitting-room and bed-chamber to keep them ventilated, that thy days may be long in the land which the Lord thy God giveth thee.
7. Thou shalt not eat hot biscuits.
8. Thou shalt not eat thy meat fried.
9. Thou shalt not swallow thy food unchewed or highly spiced, or just before hard work, or just after it.
10. Thou shalt not keep late hours in thy neighbor's house, nor with thy neighbor's wife, nor his man servant, nor his maid servant, nor his cards, nor his glass, nor anything that is thy neighbor's.—*New England Farmer.*

CITY AND COUNTRY—There is practically no disease, with the exception of typhoid and malarial fevers, which does not claim a larger number of deaths in the large cities than in the country (i. e., smaller towns, villages, and sparsely settled regions). Take consumption, for instance, and diseases of the nervous system. Out of every 100,000 of population in cities, 285 persons die of consumption. Out of every 100,000 of population in rural districts, 160 persons die of consumption. In diseases of the nervous system the figures are respectively 255 for the city and 150 for the country. These data give a very good general idea of the increased risk of living in large cities. In reality, probably very few people are acquainted with these facts, or, if they are, very few would be influenced by them in the choice of a home. And yet, when we take up our abode in a great city like New York, how deliberately we increase the number of factors which are constantly conspiring to shorten our lives. We nearly double our chance of dying of consumption, and increase by 75 per cent the

likelihood of acquiring some fatal nervous disorder. It would prove interesting reading if the intricate web of causes which produce such results could be unraveled—whether of poverty or tenement-crowding, alcoholism, dissipation, the excitement of speculation or business reverses, its position of relative importance could be assigned.

DIGESTION will not begin till the temperature of the food has been raised by the heat of the stomach to 93°; hence the more heat that can be imparted to it by slow mastication, the better. The precipitation of a large quantity of cold food into the stomach by fast eating may, and often does, cause discomfort and indigestion, and every occasion of this kind results in a measurable injury to the digestive functions. Ice-water drunk with cold food of course increases the mischief. Hot drinks, hot water, weak tea, coffee, chocolate, etc., will, on the contrary, help to prevent it. But eat slowly, anyway.

THE BUILDER.

A Crime.

The *American Architect* has recently unearthed a building transaction in which a contractor built a block of houses, which, under the contract, he was bound to connect with a street sewer. He found in excavating the cellar that to fulfill his contract he would be obliged to blast out a sewer way through solid rock, at a far greater expense than he had supposed would be necessary. Rather than do this or notify his employer and seek a compromise, he ran his pipes in another direction into a pile of loose stones where the sewage would gradually filter away, but impart their exhalations upward into the surrounding air. Soon after the houses were occupied, a mysterious illness began to occur in them. The Board of Health inspectors were called in, and soon found the cause of the trouble, but the public are not informed whether the builder was brought to justice. Of course he ought to be, for the protection of the public in future, but, in practice, it is difficult to obtain convictions. There is no condemnation too severe for a scoundrel who will deliberately and secretly propagate disease after this fashion. The offender who openly commits or maintains a nuisance detrimental to the public health is harmless in comparison, for the mischief he does is immediately apparent and can be remedied. But the death-trap set by such builders as those above described, are revealed only by their fatal results. The man who puts up a building so flimsily that it falls to pieces and destroys life before it is completed, is easily brought to suffer a penalty. But the man who willfully breeds deadly disease in a household, in a whole district, surely this man is the worse villain of the two, and as fit for the gallows as the meanest type of felony can make him.

A SERMON ON BUILDING MATERIAL—Brick is still, and is likely to remain, the favorite building material. There is nothing, except a Wedgwood crucible, that will withstand fire nearly as well. Iron is confessedly unfit for building purposes, where it may be exposed to the weather or fire, and is going rapidly out of use. Stone will always have its uses in combination with brick and terra-cotta, but stone will not weather any better in this climate than well-burned brick. Egypt, the land of all others where stone was most available, depended on the use of brick mainly. Along with her ruins of stone are yet to be seen imposing piles of brick, and sun-baked brick at that, not more timeworn than the massive stones around them.—*Architecture and Building.*

CONS. IMPERIAL—At the annual meeting of the Consolidated Imperial Mining Company, there were represented 404,357 out of 500,000 shares. The directors were re-elected as follows: A. K. P. Harmon, James Newlands, J. P. Martin, Maurice Schmitt and J. H. Dohinson. A. K. P. Harmon was appointed president, C. L. McCoy secretary, and W. E. Sharon superintendent. The financial statement showed an overdraft at the Bank of California of \$19,998.31, and the assessment now being collected will aggregate \$25,000. The superintendent's report embodied an account of the work done in the mine during the twelvemonth, and concluded with the following hopeful sentence: "As there is still remaining a large scope of unexplored ground, I hope yet to develop a large and valuable body of ore."

GERMAN ENCOURAGEMENT OF MINING—The Mining Department of the German Government has recently taken steps to establish in six different towns in the principal mining districts a free library specially for the mining population. These libraries are furnished with all the principal works on geology and mining, a complete collection of maps and all the journals devoted to mining.

"FOUR MILLION DOLLARS were taken out of the South Fork mines during the year 1889," says the *Mullan Tribune*, Idaho. "More than two-thirds of this amount was spent in the Cœur d'Alene in the development of mining property and other enterprises. There will be at least \$20,000,000 taken from our mines during the year 1890, and the wealth will keep increasing each year."

USEFUL INFORMATION.

AMERICAN AFTER ALL—Americans have read with interest the alleged invention of an artificial silk by a Frenchman, who displayed his supposed invention at the Paris Exposition last year. It turns out that the invention is as old one, and that it is an American invention. Says the *Scientific American* of March 8, 1890: "The recent development of the production of artificial silk by M. De Chardonnay, in France, has excited much interest. We have received communications from David Baldwin of Midland Park, New Jersey, who, as far back as 1871, had worked in the same direction. He claims to have succeeded in producing a cellulose fiber which he combined with tannic acid and other substances in his attempt to increase its tensile strength. Four or five years ago Mr. Baldwin made known his project to a silk manufacturer, Thomas Holt, who not being a chemist, did not care to experiment in that direction. The matter therefore lay in abeyance. Now France comes forward as the fatherland of an invention apparently conceived in America."

THE USEFULNESS OF TURPENTINE—After a housekeeper fully realizes the worth of turpentine in the household, she is never willing to be without a supply of it. It gives quick relief to burns; it is an excellent application for corns; it is good for rheumatism and sore throats. Then it is a sure preventive against moths; by just dropping a trifling in the bottom of drawers, chests and cupboards, it will render the garments secure from injury during the summer. It will keep ants and bugs from chests and storerooms by putting a few drops in the corners and upon the shelves; it is sure destruction to bedbugs, and will effectually drive them away from their haunts if thoroughly applied to all the joints of the bedstead, and injures neither furniture nor clothing. A spoonful of it added to a pail of warm water is excellent for cleaning paint.

STEEL SCREWS are quite a recent innovation, and there has never been a description published of the process of making them. The process has been kept a secret, and much pains have been taken to guard the peculiar mechanism by which this work is done. The large amount of capital requisite to start in so extensive a plant as is necessary to produce this sort of goods, and the supposed narrowness of the margin of profit, were assumed to be sufficient protection to those already engaged in the business. It has been necessary to invent and construct almost the entire plant of machinery by which the work is done. These screws are manufactured by the National Screw and Tap Co. of Cleveland, O. The capacity of the company's works is 6000 gross of screws and two tons of taps and small nails per day.

A REMARKABLE GOMMY LIQUID, formed upon and dropping from the foliage of the pine trees, in the vicinity of Danville, Va., has been attracting a great deal of attention. It gathers on and drops from the pine tags like a heavy dew, and a great deal of it has been caught and preserved in bottles. It has much the appearance of corn whiskey, but has a taste somewhat like that of wild honey. It leaves the pine tags sticky, and gives them the appearance of having been varnished. One theory is that it is produced by the remarkable weather which has prevailed in that vicinity for some time past.

A PASTE THAT WILL KEEP—Dissolve a teaspoonful of alum in a quart of water. When cold, stir in as much flour as will give it the consistency of thick cream. Carefully heat up all the lumps. Stir in half a teaspoonful of powdered resin. Pour on the mixture a teaspoon of boiling water, stirring it well. When it becomes thick, pour in an earthen vessel. Cover and keep in a cool place. When needed for use, take a portion and soften it with warm water. It will last at least a year. If you wish it to have a pleasant odor, stir in a few drops of oil of wintergreen or cloves.

THE DIRECTORS of the Provincial Bank of Ireland have issued a decree that no clerk in their employ receiving less than \$750 a year shall be allowed to marry. A similar rule is in force in some of the principal London banks. How would it do to advance salaries in such cases to an amount a little in excess of \$750 per annum?

A PETRIFIED TREE IN PLACE—A petrified tree nearly four feet through and with roots extending over about 15 square feet, was found recently in a coal mine at Osnabrück, Germany, and has been set up in the Berlin School of Mines.

TO RENDER PAPER OR PASTEBORD WATER-PROOF—Mix four parts of slacked lime with three parts of skimmed milk and add a little alum; then give the material two successive coatings of the mixture with a brush, and let it dry.

A NEW CALCULATING MACHINE—A French mechanic by the name of Bollie has invented a calculating machine which adds, multiplies and divides with astonishing rapidity by the simple turning of a wheel.

ARTIFICIAL MUSK is a new product of the chemists. It is an oily liquid of a brown color, and smells so like musk that perfumers are able to use it as a substitute for that article.

ELECTRICITY.

Electrical Progress.

The generation of electricity in the present state of the art depends entirely upon mechanical conditions, and here is the path which inventors should for the present tread. The steam engine and boiler are now necessary for supplying the power to run the dynamo, but there are two immense sources of power in Nature which ought to be and can be made available for this purpose. Wind and water are abundant, cheap, and almost universal. Some progress has already been made in utilizing water power, but only in a moderate degree. Every running river, every waterfall and cataract, possesses power now running to waste beyond the ability of man to calculate.

With the constant improvement in the storage battery, another means of power becomes available. The wind that blows free through the atmosphere can be harnessed and brought into the service of man. A windmill properly connected with the dynamo can be made to generate electricity, which could be stored up for future use. The wind is a more variable source of power than water, and at present cannot be depended upon for furnishing a constant supply, but the storage battery here comes in to our aid. Why should not vast reservoirs for the storage of electricity be constructed, just as we build them for water storage? Is not American inventive genius sufficient to solve this problem? We believe that it is.

When these two sources of power—the wind and the water—are thus utilized, who can dream even of the extension of the application of electric power?

Again, why should not small dynamos, furnishing sufficient power to run diminutive motors for domestic purposes and small industries, be constructed, operated by coiled springs or rubber bands, wound up and stretched by clockwork? The principle is old, only the application would be new. There are numerous instances where mechanical power could thus be profitably employed.

Thus the field for electric-power is constantly broadening, and it will be the duty of inventors to supply the mechanical devices by which this field can be occupied. That they will do this we feel fully confident, for American inventive genius has always risen to the needs of the occasion, and indeed the greatest inventions the world knows and uses to-day have been supplied by the brains of our own citizens.—*Boston Journal of Commerce.*

ELECTRICITY AS A SCALE PREVENTIVE—A correspondent of the *Boston Journal of Commerce* gives his experience in the use of electricity as a scale preventive, as follows: "The writer, some years ago, had charge of a boiler that had a battery connected to the shell of the boiler, so that it was kept charged all the time, and though the water was very hard, there was never any accumulation of scale, though the neighbors were all troubled with a heavy accumulation that used the same kind of water, and they tried all sorts of solutions to prevent it. This boiler was put in in 1876, and is still running. Some time after I left it I wrote to the concern to find the address of the firm that put it in, and learned that they thought it too much trouble to attend to it and had gone to using potatoes instead. Of course, the latter are known to be among the best scale preventives."

AN ELECTRIC AFTER DINNER SPEECH—At a banquet of electrical engineers in Boston, a few evenings since, those occult gentlemen assured the public that the dwelling-house of the future will be fitted for electricity as it now is for gas, not only to give illumination, but also to furnish power to run the sewing machine, the egg-beater, and even to butter the bread economically, to warm the house, to cook the food, etc., and, if necessary, to put the family to sleep. Why not go further, and apply electricity to house-cleaning, sweeping the carpets, dusting the rooms, making the beds, etc.?

ELECTRICAL TOOTH-EXTRACTOR—An electrical instrument has been invented which is designed to remove the pain incidental to the extraction of teeth. It consists of adjustable, pivotally connected prongs carrying buttons and connected with an electrical battery, the buttons being placed on the face over the nerves leading from the teeth to the brain, and a circuit established the moment the tooth-extracting instrument touches the tooth to be removed.

LIGHT AND POWER—In conducting an electric station in North Carolina, the dynamo supply enough energy to run the street cars, and to light the cars and general industries along the line. This is believed to be the only instance where light and power are furnished so extensively by the same machinery. But other illustrations of it are likely to follow at an early day.

ELEVEN MILES POWER CIRCUIT—A company which has been formed in Hartford, Conn., proposes to build a dam across the Farmington river at Tariffville, put in dynamo, etc., and generate electricity, which is to be conveyed by large copper rods, strung above ground, to Hartford, 11 miles away. About 2000 H. P. will be turned into electric energy.



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W. B. EWER.

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[NEW THIS ISSUE.]

Mill and Mining Machinery—Atlas Iron Works. Situation Wanted—A. B. C. Oakland.
Cement Gravel Mine for Sale—T. G. E. Wolleb, E. Oakland.
See Advertising Columns.

Passing Events.

The first general movement in this State toward the preparation of a California exhibit at the coming World's Fair, was made this week by the Governor issuing circulars on the subject to the mayors of the cities. By starting thus early, California should be able to make a creditable showing of its various industries.

The streams all over the country are running bank-full owing to the rapid melting of the snow in the mountains. The main rivers are very high, but thus far no damage has been done.

The quartz mines of Fresno county are just now attracting some attention. Few of them are at any advanced stage of development, but there is quite an area that promises to furnish many valuable quartz properties.

The strike of the molders in this city still continues, to the great detriment of the iron industry here. However, all the shops are now running, having brought men from the East to take the place of the strikers. Nevertheless, there is still much inconvenience in the situation.

The Kansas smelting men claim to have invested \$7,000,000 in their smelting plants, but a leading Colorado smelter has investigated this and says that the investment does not reach \$750,000.

Analysis of an Air-Lift Pump.

At the last meeting of the Technical Society of the Pacific Coast, P. M. Randall, C. E., read an elaborate paper giving an analysis of the action of the Pohle air-lift pump which was recently described in the MINING AND SCIENTIFIC PRESS. This invention of Dr. Pohle for lifting water consists, in its simplest form, of a water pipe, and an air pipe let into it. In pumping, compressed air is forced through the air pipe into the water pipe; thence, by the expansion of air, the water is lifted and discharged from the upper end of the water pipe. As air is forced into the water pipe it forms alternate layers with the water so that the weight or pressure per square inch of the column, thus made up of air and water inside, is less than the pressure of the water per square inch outside the water pipe.

Owing to the difference of pressure, the water flows continuously from the outside into the water pipe by the force of gravity. As the air is forced into the water pipe the water at first above the outlet end of the air pipe rises in an unbroken column free from bubbles and flows smoothly off, till the underlying column of propelling air escapes. Owing to the relief afforded by the discharge of this under column—whose pressure while the column is being lifted, checks the flow of water into the pipe—the action of the pump is somewhat irregular. This is, however, but temporary, and is succeeded by constant uniformity of action by which the pump discharges an intermittent or pulsatory stream.

With respect to the diameter of the water pipe of the air-lift pump that may be employed with success, Mr. Randall states that he has tested the working of pipes respectively two, three, eight and ten inches in diameter with highly favorable results, and sees no valid reason for there being a limit to the diameter providing the quantity of air employed be proportioned to the water. If small quantities of air be let into the water pipe, insufficient to constitute a layer pressing against its walls, the air will obviously rise in bubbles through the water and escape, with limited results; but if a sufficient quantity of air be forced into the water pipe to form an air-layer pressing the pipe-walls, and to impart proper motion to the superincumbent water, the water will be successfully discharged with inappreciable loss by leakage, regardless of the magnitude of diameter of the pipe.

In working the air-lift pump, maximum efficiency is attained when the pressure per square inch of the aggregate layers of water inside the water pipe is equal to two-thirds the pressure per square inch outside of it. In other words, when the aggregate length of the water-layers inside of the pipe is equal to two-thirds the depth of submersion, estimated between the surface of the water and the outlet end of the air pipes, the energy due the pressure of the remaining one-third of the depth of the submersion is expended in imparting motion to the contents of the pipe and in overcoming the resistance of entry or inflex and the resistance of the walls of the pipe.

Mr. Randall goes at great length into details of tests and mathematical calculations as to efficiency and the determination of various features. He concludes by referring to the fact that in pumping hot liquids the efficiency of the device is increased by the utilization of the force of their head; that it pumps water carrying sand, silt, gravel, sewage, etc., with facility and without appreciable injury to itself; and that it possesses rare merits with respect to lightness, compactness, durability, property of being handled and managed with ease, cheapness as to first cost and subsequent cost of being kept in use—in fine, ultimate economy. Its application to mining has already been referred to in the PRESS. The system is being applied to mines in Colorado now by its inventor.

THE Pelton Water-Wheel Co. have just issued a new illustrated catalogue. It has been prepared evidently with great care, and presents much more information bearing upon water-wheels than anything of the kind before issued. The data and tables cover all points of inquiry on this subject. The typographical appearance of the catalogue is excellent.

THE slate quarries of El Dorado county are doing very well just now.

Sinking Shafts in Watery Ground.

Of all kinds of work for which the skill of the engineer is called into requisition, that of making excavation in earth where a head of water is to be resisted is conceded to be the most troublesome. The name quicksand is given to any earth which when mixed with water will in some degree run like a fluid. Almost any sand when mixed with a small amount of clay, will exhibit this faculty. The most troublesome kind has but a small percentage of sand and is very fine, the material being principally disintegrated rock. When rubbed between the fingers scarcely any grit can be felt. This material, when undisturbed, may have some consistency, but when once broken will flow with water through any minute opening. In excavation in running ground the great difficulty is not so much in keeping the water out as in preventing damage from quicksand shifting in its bed, which is likely when water is pumped from the excavation, as it destroys the equilibrium of the mass. In the case of deep excavations like shaft work, it will bring an unequal or hending pressure on the walls of the shaft, which destroys its alignment or ruptures the shaft entirely.

The freezing process for working this kind of ground has now passed the experimental stage and is entitled to a place among established processes of engineering. Edward L. Abbott, C. E., read a paper recently before the Boston Society of Civil Engineers, in which he describes the application of the process. A series of vertical pipes are put down into the rock, into material impervious to water. These pipes are arranged around the space in which the excavation is to be made and are closed at the lower ends. There is on each an inner pipe open at its lower end and extending nearly to the bottom of the outer.

Through these pipes a cold fluid is circulated by means of a pump; this admits the heat from the surrounding earth and freezes it as hard as sandstone rock, most effectually cutting off the water. Then the excavation can be readily made without any trouble from water or flowing ground. Quicksand, when deprived of its water, is an easily worked material.

By this method a shaft 15 feet square was sunk about 100 feet to a rock ledge, through water-bearing strata at the Chapin mine, Iron mountain, Michigan. Twenty-seven eight-inch freezing pipes were arranged in a circle 29 feet in diameter. An immense ice-machine, of the compression type, was used. The wall was frozen and excavations made to the ledge in 2½ months. On starting the ice-machine, the earth commenced to freeze in the form of cylinders, surrounding each pipe. In ten days these cylinders were in contact, forming the frozen wall. From that time the freezing advanced within much faster than without the circle. The unfrozen center became narrower as the excavation proceeded, requiring much difficult labor in loosening the frozen material and hewlers. Those strata of earth containing much water were frozen to much less distance than those containing little water.

When approaching the ledge there was a great inflow of water, the rock being seamed and shaly, and it was necessary to lay freezing pipes against the ledge, and to flood the shaft and freeze a considerable portion of the rock surface itself before the excavation into the sound rock could be completed and the timbering put in. In shafts now sunk, the freezing pipes are sunk five or six feet into the rock itself.

ERNEST WILTSEE, formerly assistant superintendent of the North Star mine, has been appointed superintendent of the Menlo mine at Grass Valley. Mr. Wiltsee was at one time chemist of the Globe Smelting and Refining Company of Denver and is a graduate of the Columbia School of Mines. He is highly spoken of at Grass Valley.

THE Chamber of Commerce of Bordeaux, France, has offered a series of prizes for the best reports, based on actual experience, of the use of oil at sea. The competition is open to the vessels of all nations, and reports must be made by Jan. 30, 1891.

A NUMBER of German engineers have been looking over tracts of land near the City of Mexico with a view to the location of extensive smelting works.

Cost of Working Gold Deposits.

The main tendency in handling gold ores and gravels in these days is toward economy. Elaboration of processes and methods has long since been discontinued, for it is realized that the simpler the means the better. Each succeeding year sees at least a slight improvement in carrying out the methods employed, and every reduction in cost of a dollar or less brings to the front new mines to which that dollar's difference is a question of profit. Gold ores are now worked in this State cheaper than anywhere else in the world, and they are worked better, too. Years of experience have taught our millmen how necessary exact care and economy are.

In handling auriferous gravels, we have also experience in California not found elsewhere. The various forms of gravel mining have been here developed to their greatest degree. All known forms of gold deposits are found in this State, and in each there are men skilled in working them. In this connection a statement by John Hays Hammond in the last report of the State Mineralogist will be of interest. He gives the relative costs of working the various classes of gold deposits by methods adapted to the respective classes as follows:

1. Auriferous vein, \$3 to \$10 per ton of material treated.
2. Drift mining, 75 cents to \$4 per ton of material treated.
3. Miners' pan, \$5 to \$8 per ton of material treated.
4. Rocker, \$2 to \$3 per ton of material treated.
5. Sluices, 75 cents to \$1 per ton of material treated.
6. Hydraulic method, 1½ cents to 8 cents per ton of material treated.

California at the World's Fair.

Much interest is being kindled in the proposition for a full California exhibit at the Chicago World's Fair of 1892. The general sentiment seems to be echoed in the words used by Governor Waterman in a circular letter just issued to the chief officers of the cities and counties of the State, calling upon them to "bring to the attention of their constituencies the vast importance of California being properly represented at the World's Fair, to be held at Chicago, Ill., in October, 1892. The exhibition at Chicago will be California's opportunity, but she will lose that opportunity unless her representative men come to the front and present these matters for consideration absolutely necessary to induce the people of their respective localities to interest themselves in the welfare of the State." It is to be hoped that this exhortation will be heeded. Some organized effort is already under way, but it should be more general. It is important that the matter should be liberally treated by the coming Legislature, and for this purpose organization should be pushed in all Senatorial districts, and Assembly districts as well, for it is important to muster all possible votes in favor of the projects which will no doubt come forward at Sacramento. Governor Waterman has applied for ten acres of space, and it should be filled five stories high with California displays.

Mining Stock Quotations.

EDITORS PRESS:—Will you please decide through your valuable paper the following question: A wagers that mining stock quotations are so much per share. That is, if the stock is quoted 50 cents, and the stock is issued at \$10 per share, 50 cents is the price of the full share of \$10, and not 50 cents on the dollar. B wagers that the quotation is so much on the dollar, either above or below par as the case may be, and not so much per share. A. R. Virginus, Cal.

Mining stocks are quoted at their market value without reference to the original par value on the capital stock of the company when incorporated. In this State a mining company can assess the stock to its full capital or par value but not more, without reorganizing. This is the only advantage of organizing with a large capital stock, with original par value set at a comparatively high valuation. Many companies are organized with capital stock of a million or so, and shares at \$5 or \$10, when the stock is really sold for 10 cents or 20 cents per share. The market quotations mean what the stock brings on the market, and the original par value is not considered at all on the market.

LAST month the Cons. Cal. and Virginia mine milled 11,940 tons of ore, yielding \$194,653—about half gold and half silver.

The Deep Gold Placers of California

(Concluded from page 331)

white; streak lighter; hardness, 6; specific gravity, 2.921; contains silica 50.8 per cent, alumina, 10.4; as seen under the microscope the large minerals are not crystalline.

Another specimen, No. 2 (B), has been named andasite. It is from the large boulder referred to in Prof. J. D. Whitney's "Anthriferous Gravels of the Sierra Nevada," fol. 449. Color, gray, mottled with lighter and darker spots and blotches; streak lighter; hardness, 7; specific gravity, 4.403; silica, 44.3; alumina, 16.4; iron large; under the microscope minerals seem much like 2-A, but more compact.

White lava No. 3 (A), Calaveras county. Fusible B. B. to pearly globule; does not change color otherwise; luminous in flame like lime; no soda reaction; under microscope not sedimentary; texture and appearance like pomice; some parts hyaline. Under a high heat it fuses to a beehive glass. Muffle heat is not sufficient to so fuse a piece half an inch in diameter. Some parts turn white but do not fuse; refractory crystals are not seen until heat is applied; when heated and fused to a globule, it is pearly and translucent; with cobalt no blue color; not chalcidonic; perhaps solfataric but doubtful; does not seem to be volcanic ash.

No. 3 (B), marked Volcanic Ash, Napa county. Specific gravity, 1.81; silica, 66.8; sesquioxide of iron, 9.9; fusible before blowpipe to black slag; color and streak, ash gray; hardness, 4; when highly magnified is white, opaque, vitreous paste, with imbedded angular, transparent, white and grayish glassy fragments like hyalite or impure semi-opal. A very interesting specimen.

Another specimen of No. 3 (C) somewhat resembles 3-A but is porphyritic, filled with vesicular cavities, almond-shaped with a white opaque shell, rock filled with cracks showing a tendency to disintegrate, cavities generally empty, sometimes containing acicular crystals; sometimes botryoidal, not chalcidonic; generally, numerous minute vent-holes for water or steam indicate a solfataric origin.

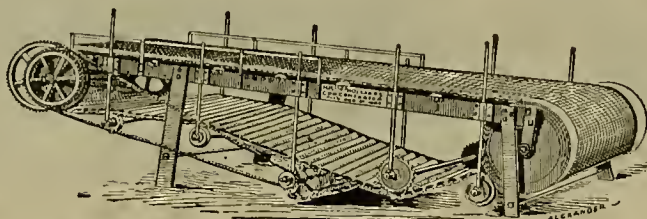
No. 4, from Messenger's Corral, Calaveras county, seems to be a mud porphyry; hardness, 3; gray matrix with white spots and white and dark particles; soft when recently quarried, when it cuts like tallow or soapstone.

Table Mountains.

What are known as table mountains in California are the remains of "mesas," so called by the Spaniards, which were once continuous

A New Ore Concentrator.

Mr. H. P. Holland, a practical mining engineer of this city, has recently invented a concentrator which combines the well-known blanket process with new and original features. He claims that the machine does away with the faults of the old system while very much increasing its capacity, and saving a much higher percentage of the metals. It consists of an endless corrugated woolen belt, backed by strong waterproof material which is stretched over rollers hung in a suitable frame. It is fed at the upper end, and underneath is a revolving bristle brush kept in constant action against the belt, while the machine is in motion, thus cleaning the belt at every revolution. With the exception of the belt and brush, the machine is built entirely of metal and in a very substantial manner. The concentrator has been sub-



THE HOLLAND WOOLEN BELT FOR CONCENTRATORS.

mitted to severe tests, and the inventor states that it has amply sustained its high claims as to saving capacity over others. The accompanying cut gives a very good idea of the machine. Fuller particulars can be had by writing to the inventor, Mr. H. P. Holland, 2322 Folsom St., San Francisco.

RANCHERS AND MILLMEN.—C. M. Taylor of Genoa suggests a new plan for the ranchera and millmen of Nevada to settle their pending litigation. The *Courier* says: His plan is for both parties to take the money that will, ac-

COMPRESSED FUEL.—A bag of rough, dark balls, looking somewhat like unshucked black walnuts, was lately handed us from the Giant Fuel Co. of S. F. They were composed, we understand, of coal-dust with a small admixture of cornmeal, lime and potash, which had been wet, stirred together, molded and dried. The sample was taken home, where it was used in the cook-stove with great approval, and a wish was expressed for more of the same sort. This device for utilizing the coal-dust, which has so long been useless, appears to be a valuable one, and it is estimated that the total cost of the "Irving Patent Fuel," manufactured, need not exceed \$5 per ton. The company has established a plant of 10-ton daily capacity on Main street, and will soon be making it in considerable quantity.

MUNN C. HILLYER, who was at one time a

Comstock mining superintendent, but lately a mine-manager in Central America, died in New York this week. Mr. Hillyer has been connected with mining matters on this coast from "early days."

The first printer in this State was Juan de la Rosa, who came to Monterey in 1833 with a printing and publishing outfit for the Mexican Government. He will be 100 years old on June 5th, and his birthday will be celebrated at Ventura. It has been suggested that a purse be raised for him, to brighten his remaining

Just Punishment.

Two of the so-called "patent agents" who have been carrying on the business of duping inventors by false pretenses of negotiating the sale of their patents, received heavy sentences this week in the U. S. Court. They were convicted of having used the United States mail for carrying out a fraudulent scheme. Both men were out on bail, with relatives on their bonds, and attempted to leave the State and get out of the jurisdiction of the courts. This plan was forestalled by the officers, however, and the men were arrested, handcuffed, brought back and imprisoned. On Wednesday they received sentence. Clarence Sanborn was sentenced on the various indictments to a total of three years imprisonment and \$750 fine. Samuel Sanborn, one of the other persons implicated, and whose trial was to have come up next, was so much impressed with the severity of the sentence that he pleaded guilty, and threw himself on the mercy of the court. He was given eighteen months in prison and further condemned to pay a fine of \$100.

After the sentencing of the Sanborns, District Attorney Carey surprised those in the courtroom by asking for a nolle prosequi against E. S. Atkin, who, he said, informed the officers of the Sanborns' plan for escaping, and it was only by reason of this information that they were recaptured. The Judge granted the request. Atkin is now in Escondido, Mex.

These people have for several years been conducting business under various names, the principal one being the "Globe Patent Agency." Their ostensible business was to conduct the sale of patents and patent rights.

Circulars were addressed to inventors all over the country, and by various means sums of from \$15 to \$20 were obtained from numbers of patentees, generally on the plea of making a search for title to carry out an impending sale. After securing the money, nothing was done and the inventors would get no further information. Many complaints have been made to the police and others, but these schemers have heretofore been able to get out of the law's meshes. This time, however, they were unable to escape the United States authorities.

While there are, of course, honest institutions for the sale of patents, there are also many of the kind conducted by these men. It behooves patentees, therefore, to inquire closely into the standing of those with whom they have dealings of that nature. If the scoundrels could be weeded out of the big cities and punished as these will be, it would be a good thing for the inventors of the country.

The Mining Bureau Museum.

The following are among the recent additions to the collection of California State Mining Bureau:

- Chalcodite—Santa Barbara, from M. Goldtree.
- Calamine—Daggett, San Bernardino Co.
- Gold nugget (30 ozs.)—Blue Wing hydraulic mine, Iowa Hill, Cal.
- Gold—Fine specimen leaf, Kelsey, El Dorado Co.
- Native copper on analcite—Lake Superior, G. O. H. Reilly.
- Azurite and malachite—Holbrook & Cave mine, Arizona, Lewis Williams.
- Large number of Indian arrow and spear heads, stone axes, etc.—J. Z. Davis.
- Number of polished specimens of Scotch and Irish granite, J. Z. Davis.
- Minerals from Eastern States and Japan—J. Z. Davis.
- Auriferous porphyry and quartz—Cerro Colorado, Mexico, M. A. Delis.
- Rich gold quartz—Silver Peak, Nevada, John Chiatowitch.
- Gold quartz from Beveridge, Inyo Co., Cal., John Chiatowitch.
- Native silver—Silver King mine, Arizona, John Skinner.
- Gold in quartz—Mariposa, J. Z. Davis.
- Several specimens of gold quartz—El Dorado, Cal., H. E. Stockwell.
- Gold and quartz crystals—Jamestown, Cal.
- Polished serpentine—Amador Co., Cal., R. A. Weiss.
- Rich gold quartz—Gambetta and Mountain View mines, Fresno Co.
- Alabaster—White Plains, Nevada, W. E. Lindsey.
- Gold quartz—Shasta Co., Cal.
- Scheelite—Julian, San Diego Co., A. J. Burnett.
- Lava—Hawaiian Islands—J. Bryant.
- Dendrite—Petaling, Cal., B. C. Hesseltine.
- A number of specimens of rare minerals from the Eastern States—Miss S. P. Monks.
- Minerals from Santa Catalina Islands, and various ores, building stones, etc.

The rivers of the State are at a very high stage, owing to the rapid melting of the snow in the mountains.

NINE Comstock lode mines milled last week 6562 tons of ore valued at \$78,275.



SPANISH PEAK, SEEN FROM ONION VALLEY AT FOOT OF PILOT PEAK.

plains and are supposed to be lava from some source not yet determined, but owing to the fluidity of the eruptive matter, they were very nearly level. Natural erosion subsequent to their birth, caused deep depressions. The intact portion remained, capping low summits, now elevated table mountains.

The surface of these mesas exhibits none of the features of volcanic matter ejected from a crater, so conspicuous at Vesuvius, Hecla, Aetna, Manna Loa and other great volcanoes.

It is not uncommon on the Pacific Coast to find the lavas brecciated or conglomerated, the matrix being entirely different from the fragmental inclusions, so much so that the observer naturally infers that the so-called lava partook somewhat of the nature of plastic earth or volcanic mud, and that in its flow it had gathered boulders of a somewhat similar but older formation. At Picket Post, Pinal county, Arizona, obsidian pebbles were abundant in the lavas. At the Spring Valley hydraulic mine, Butte county, boulders of basalt and quartz were seen so imbedded.

From a distance these flat mountains show an extended horizontal summit, terminated at one or both ends by a mural cliff, from the foot of which a talus of fallen debris extends at a sharp angle to the plain below. Fig. 7 is an ideal view of a California table mountain and a lava-capped ridge.

cording to present appearances, he spent in litigation, and use it for the construction of a large flume to run almost direct from Rodenhah's to the mills. This, he claims, would carry one-third of the stream at low water, which would be sufficient to run the mills, considering that there would be but little water or evaporation, as the water would run that distance in a flume in about one-sixth of the time required for it to flow down the regular channel. This would leave the ranchers two-thirds of the stream for irrigating purposes.

The coal trade between Newcastle, N. S. W., and this port has fallen off greatly. In the last quarter there were shipped 29,000 tons of coal, as against 69,000 tons in the preceding quarter. The collieries on this coast are now producing coal in such quantities as to reduce the price from \$12.50 to \$6.50 per ton.

A LARGE deposit of antimony is reported in the Toasra mountains south of Big Creek, Lander Co., Nev., and 15 miles from the Nevada Central R. R. The ore is said to carry 80 per cent antimony.

days, and the printers and publishers of the State are to be called upon to contribute to it. Stephen Bowers, editor of the *Ventura Free Press*, Ventura, Cal., will give any information desired.

ARID LAND IRRIGATION—There promises to be a sharp conflict over the subject of Government irrigation work for arid lands. On another page of this issue may be found full outlines of the two reports presented by the Senate Committee on Irrigation—the committee which visited California last summer. As will be seen, the two reports are directly in conflict. It will have to be fought out at Washington, and there bids to be much fun in the air before it is over.

GEORGE GOODMAN of this city has been engaged by Governor Stanford to lay the artificial-stone walks, in the highest style of the art, in the arcade of the Leland Stanford Jr. University at Palo Alto.

THE Humboldt reduction works, Winnemucca, Nev., will soon be started up again.

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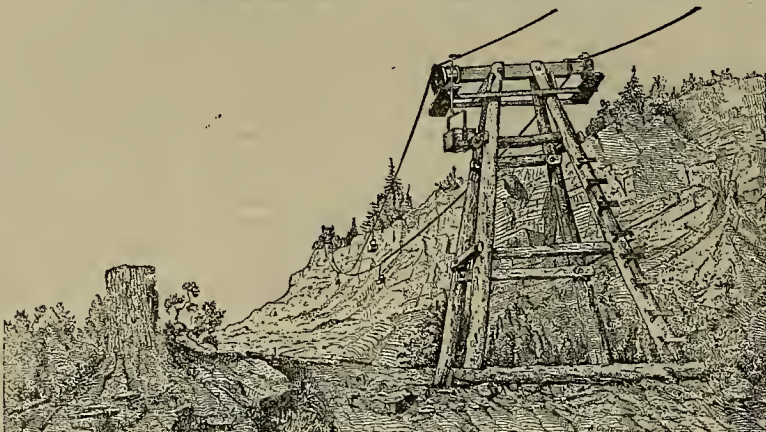
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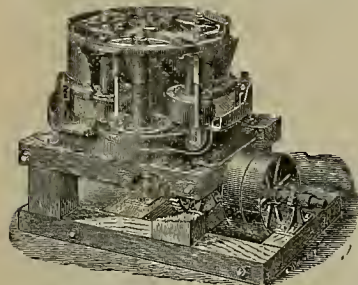
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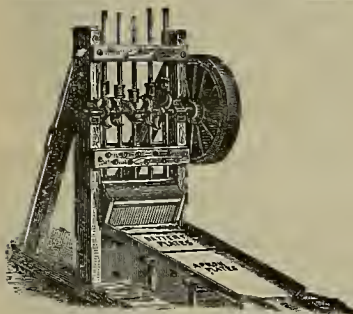
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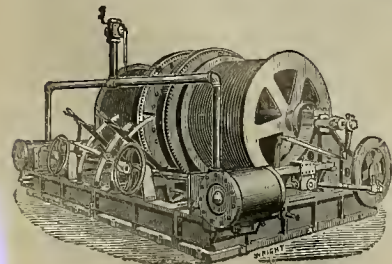
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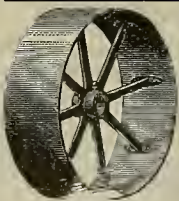
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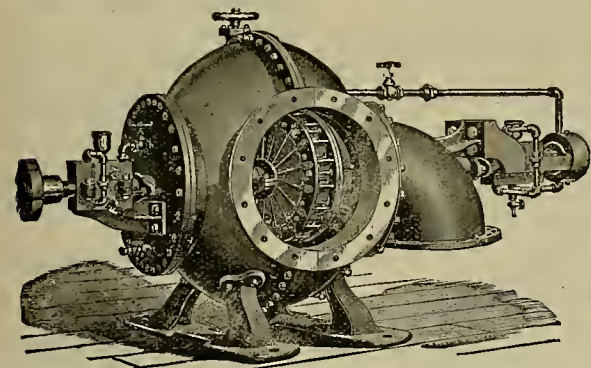
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Thomas.....	35 00 @
Cargolcet.....	32 50 @

Assessment Notices.

GRAY EAGLE MINING COMPANY, Location of principal place of business, San Francisco, California. Location of Works, Placer county, California. Notice is hereby given, that at a meeting of the Board of Directors, held on the 1st day of May, 1890, an assessment, No. 17, of five (5) cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 11, No. 303 California street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 10th day of June, 1890, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 30th day of June, 1890, to pay the delinquent assessment, together with the costs of advertising and expense of sale.

By order of the Board of Directors.
J. M. HUFFINGTON, Secretary.
Office, Room 11, No. 303 California Street, San Francisco, California.

GOLD HILL MINING COMPANY—Location of principal place of business, San Francisco, California; location of works, Grass Valley, Nevada County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 17th day of April, 1890, an assessment (No. 2) of Twenty-five Cents per share was levied upon the capital stock of the Corporation, payable immediately, in United States Gold Coin, to the Secretary, at the office of the Company, Room 20, Phelan Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 24th day of May, 1890, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 10th day of June, 1890, to pay the delinquent assessment, together with costs of advertising and expense of sale. By order of the Board of Directors

C. A. GROW, Secretary,
Office, Room 20, Phelan Building, San Francisco, California.

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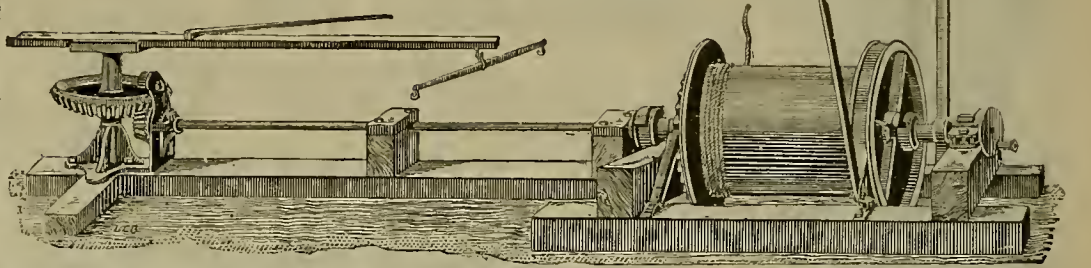
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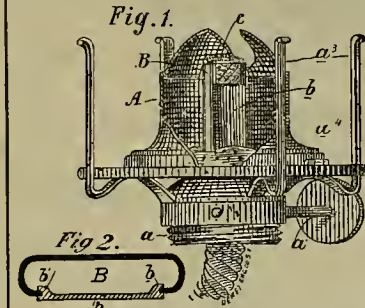
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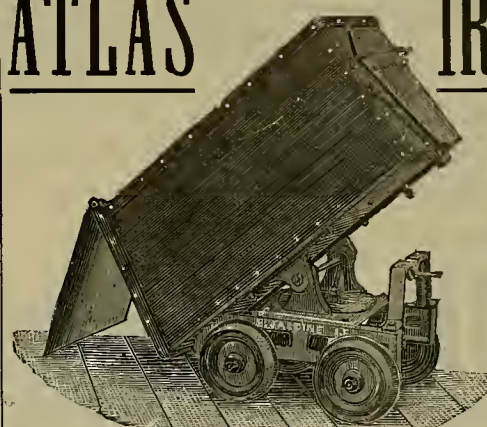
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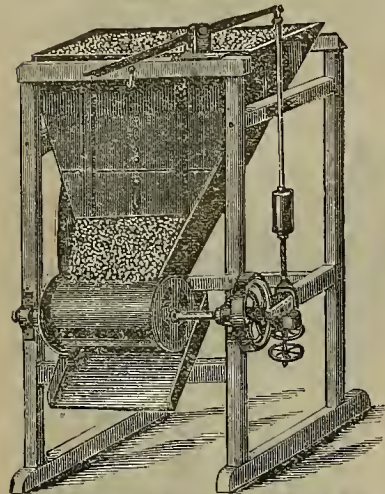
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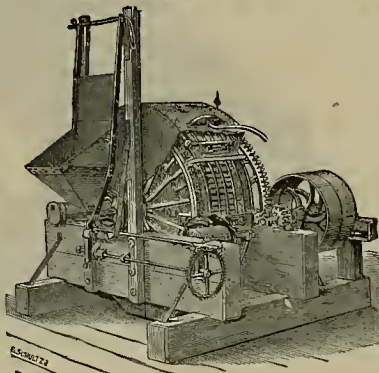
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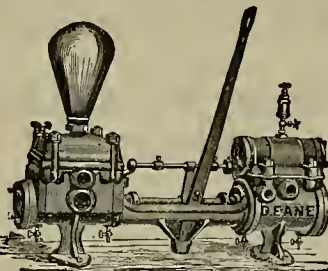
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It was written by W. A. Goodyear, Mining and Civil
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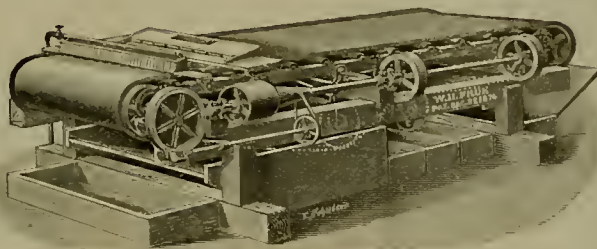
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Protected by Patents December 22, 1874; September 2 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883; July 24, 1888. Patents applied for.

There are Over 2200 Plain Belt Machines now in Use.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.
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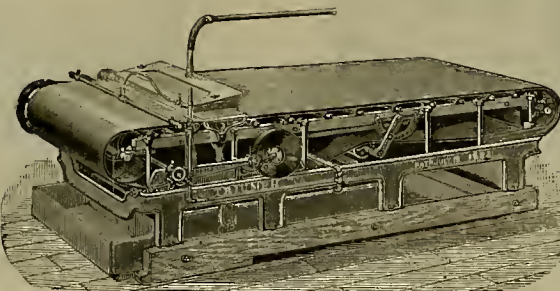
N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

"TRIUMPH" ORE CONCENTRATOR WITH IMPROVED RIFFLED BELT.

The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frue" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frue" Vanner is the best ore concentrator in the market. The fact that the "Frue" have improved (corrugated) belts does not militate against the superiority of the "Triumphs;" for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.

Price "Triumph" Concentrators, with Improved (Patented) Belt - - - \$650 f. o. b.
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We are prepared to guarantee the superiority of the "Triumph" over the "Frue" or any other form of Concentrator, for coin if need be. Circulars and testimonial letters furnished on application.



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(PATENTED.)
Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

Original Empire Mill and Mining Company,
Principal Office, 401 California St., cor. Sansone, S. F.
Location of Works, Oriskany Valley, Nevada Co., Cal.
GRASS VALLEY, NEVADA CO., CAL., NOV. 10, 1885.
Joshua Hendy Machine Works, 39 to 51 Fremont St., S. F., Cal.:

GENTLEMEN—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.

At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrators is the equal, if not superior to any other style of Vanners or concentrating devices. DAVID McKAY, JR., (Signed)

Sup't North Star and Original Empire Mining Co.
N. B. When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.

PARKE & LACY COMPANY

—IMPORTERS AND MANUFACTURERS OF—

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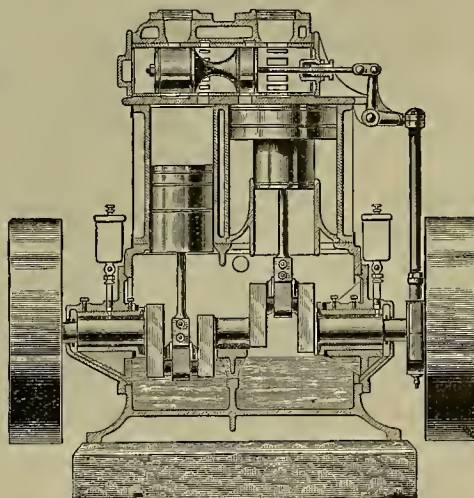
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GOLDEN GATE CONCENTRATORS,

GREATEST CAPACITY OF ANY CONCENTRATOR MADE,

One Machine Taking Pulp from 10 Stamps.



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Grand Total, 309 Engines, Aggregating 13,975 Horse Power.

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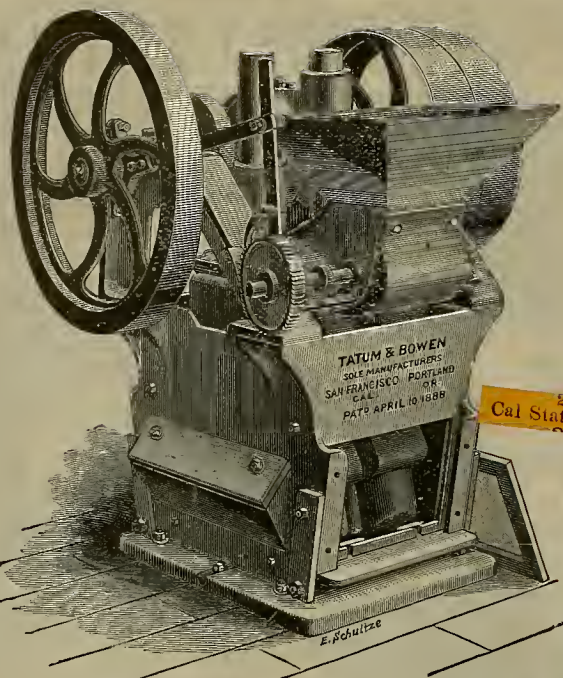
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**PERFECTED
 DOUBLE
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Attached to each Mill
 is an effective
**Automatic Ore
 Feeder.**

RAILROAD FLAT, CAL., May 15th, 1889.
 MESSRS. TATUM & BOWEN, San Francisco—GENTLEMEN: I have had many inquiries in regard to the performance of your oscillating Stamp Quartz Mill, to all of which I have made substantially the following answer:

That it will crush and discharge through a No. 30 mesh wire screen, 6 tons of average quartz per 24 hours; that, compared with the common stamps, the power required to do the same amount of work is considerably less—the slipping motion of the stamps reducing the ore much faster than the drop alone can; that the discharge is good, and as to amalgamating and saving gold, my experience with it is that it is just about the same as the ordinary battery.

To the above I shall add that the new Automatic Feed attached is a perfect success. It can, in a moment and without stopping, be adjusted to feed just as "high" or "low" as desired, and can be depended upon to supply the stamps with ore exactly as they need it. This is important, as it saves feeding by hand, which cannot be considered at the present day, or the purchase of a high priced feeder.

Considered as a convenient Mill for prospecting, or for a small mine, it fills the bill.

Yours truly,

[Signed]

JAS. S. REYNOLDS,
 Supt. New York Mine, Railroad Flat.

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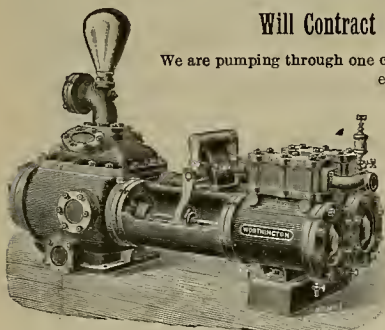
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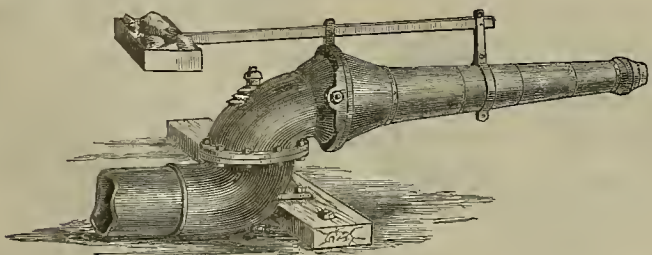
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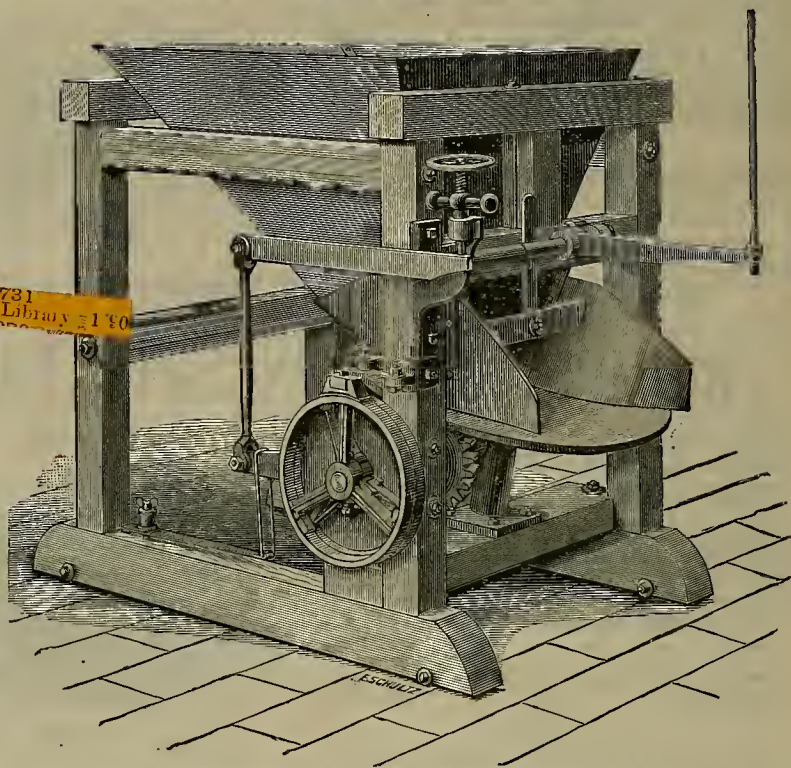


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D. O. WICKHAM, Taylor Mine, Greenwood, Cal.
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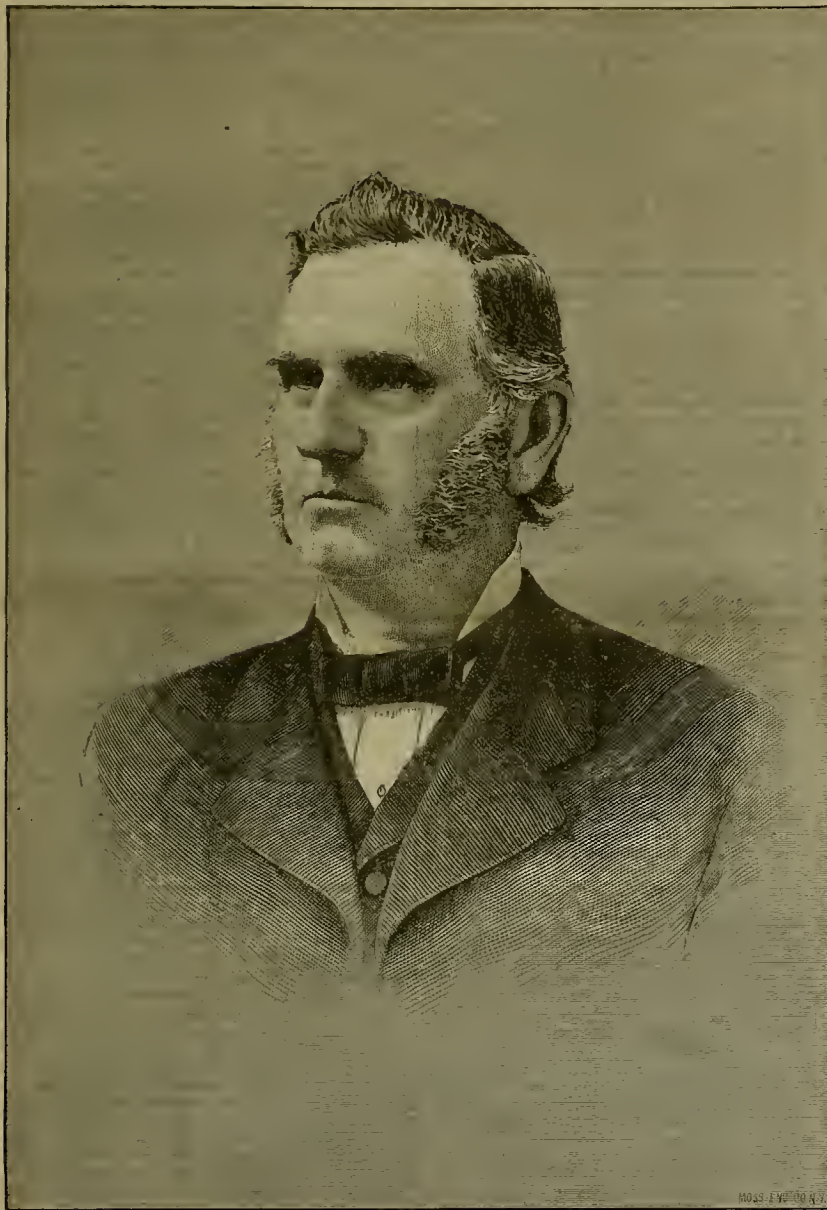
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THE LATE JOSIAH STANFORD.

The Pioneers Passing Away.

Those who were identified with the early mining history of this State are becoming fewer and fewer as the years roll on, and scarcely a month passes now but we are called upon to chronicle the death of some of these pioneers. Within the past week four prominent men, who came here in early days and were closely identified with the history of the State, have "passed over the river." Josiah Stanford, Alphens Bull, John H. Redington and Wm. P. Fuller were all men who, in building up the fortunes of the State, built up fortunes for themselves as well.

Josiah Stanford was the eldest brother of Senator Leland Stanford. He spent his childhood on his father's farm in Albany county, N. Y., and at the age of 18 went to New York City and spent a year in the hardware business, returning in 1836 to the farm, where

he remained until the California gold excitement of 1849.

Josiah Stanford was the first of the brothers to become infected with the gold fever. He took passage in the steamship Falcon at New York on the 27th day of August, 1849, via Panama, and entered the bay of San Francisco on the 31st of October, 1849, making the trip in 65 days.

Like the majority of the argonauts, his first anxiety was to reach the mines, and providing himself with the necessary mining outfit, he made his way to Mormon Island, where he wielded the pick and shovel as a miner with varying success for about a year. Becoming weary of the hardships of a miner's life, and becoming convinced that more gold could be gained in mercantile pursuits, Mr. Stanford laid down his pick and shovel and engaged in business at Mormon Island as a trader. He procured a stock of miners' supplies and gen-

eral merchandise, and soon found himself in the enjoyment of a lucrative business.

After trading at Mormon Island for another year, he sought a wider field of mercantile enterprise and moved to Sacramento, where he opened a general merchandise store. This he conducted successfully until 1856. In the meantime, induced no doubt by his representations, several of his brothers had arrived in California, and, forming a partnership, they opened an extensive oil and lamp depot, which they conducted until 1869, when Josiah Stanford withdrew from the firm, and, purchasing a vineyard, has since given his attention to viticulture and fruit-raising.

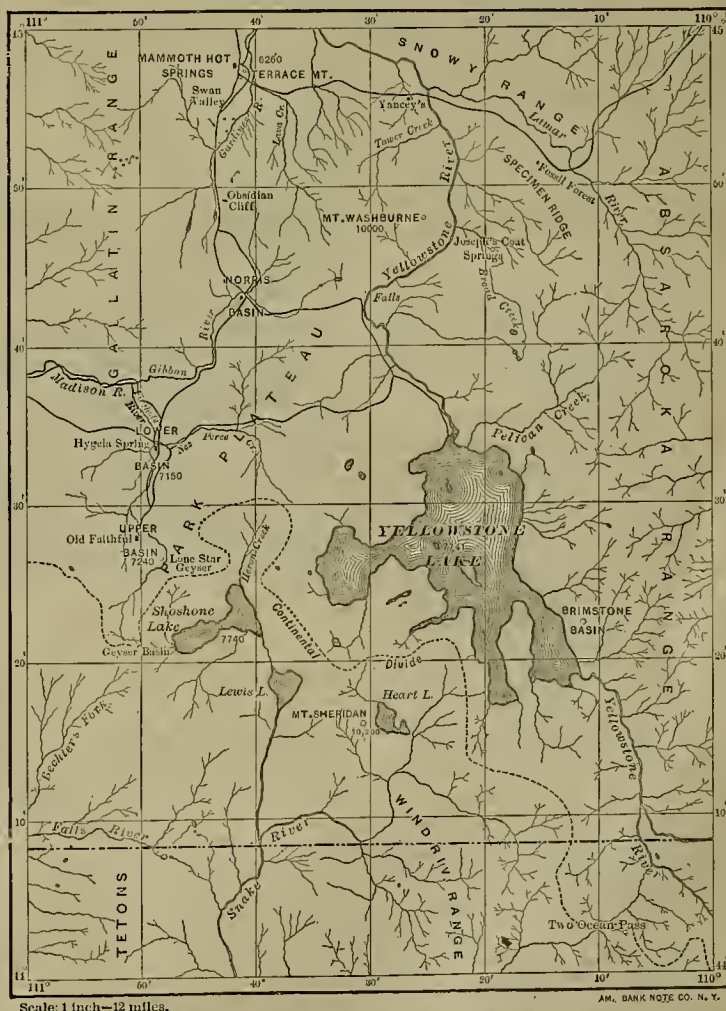
Among his other possessions is the famous Warm Springs Vineyard property, in Alameda county, which was given to him by his brother Leland. Mr. Stanford was a member of the Society of California Pioneers, in the affairs of which organization he took a deep interest. It was ever a matter of pride with him that he helped to lay the foundations of the great new State, whose welfare he always had at heart, though never given to the seeking after public preferment. He was one of the Board of Trustees of the Leland Stanford, Jr., University, and it is quite probable that had it not been for his efforts and representa-

tions, which brought Leland Stanford to this coast, California would not have rejoiced in that great institution. Mr. Stanford leaves a widow, son and daughter. He was 73 years old at the time of his death, but looked much younger, as he was a man of powerful frame and strong constitution.

Alphens Bull was accidentally drowned by falling from the seawall at Fort Point while visiting that place with his family. Mr. Bull was 74 years of age and a native of New York. Prior to his arrival in California in 1849, he was a minister of the Gospel. Shortly after his arrival here he moved to Red Bluff and Shasta, where he had a successful experience, and was soon one of the most prominent, wealthy and respected merchants of Northern California. He was then a member of the firm of Bull, Baker & Co., but having acquired a fortune, moved to San Francisco and became connected with the Fireman's Fund Company as its vice-president. This was 25 years ago, but since then he has also been prominently identified with other insurance corporations and mining operations in this city. He was president of the Gould & Curry and several other mining companies.

Besides his home at Leavenworth and Francisco streets, where he has lived a great

(Continued on page 352)



THE YELLOWSTONE NATIONAL PARK—See page 352.

Irrigation Surveys.

It is telegraphed from Washington that the irrigation of arid lands will be made a party question. Majority and minority reports have been completed by the Senate committee, and General Vandever says the same thing will likely happen in the House committee. Senators Stewart, Plumb, Moody and Casey have completed the Senate majority report.

Majority Report.

Following is a synopsis of the Senate majority report:

Before giving a detailed account of the investigation of the committee, some general observations and suggestions as to what action should be taken by the Government to enable the people to reclaim and settle upon the arid lands of the United States are submitted. Over two-fifths of the area of the United States, exclusive of Alaska, require irrigation to insure regular crops, and in at least four-fifths of the arid region, irrigation is a necessity for the production thereof.

This arid region comprises between 120,000 and 130,000 square miles, being a third larger than that of British India, and very similar to it in its general characteristics. The amount of land that may be brought under cultivation in the arid region is variously estimated at from 75,000,000 to 150,000,000 acres.

It is safe to predict at least 100,000,000 acres will ultimately be brought under cultivation by irrigation, and that, too, by water in sight, which, when properly utilized, will reclaim at least 10 per cent of the whole arid area.

The question for consideration is: What action should be taken by the Government to enable the people to reclaim these desert lands? Their reclamation must be initiated and executed by the people, and not by the Government.

In India, and in fact in all countries under monarchic or despotic rule, the work of irrigation has been carried on under Government control, and largely with Government money. The Government of British India has already expended several hundred millions of dollars in constructing irrigation works, and is continuing such expenditures on a most magnificent scale.

Reports show that the investment has been profitable to the Government and of the greatest possible advantage to the people, but there is no necessity for the United States to engage in such expenditures. If an opportunity is furnished to the people of this country, they will reclaim these desert lands, so far as reclamation is necessary. The most important action by the Government in aid of the reclamation of these desert lands was the passage of the Acts of October 2, 1888, and of March 2, 1889.

By the first of these Acts \$199,000 was appropriated for topographic surveys and \$100,000 for surveys pertaining to irrigation; \$60,000 was diverted by the Director from that purpose and added to the appropriation for topographic surveys, making a sum of \$259,000 for topography and leaving only \$40,000 for irrigation.

By the Act of March 2, 1889, \$200,000 was appropriated for topographic surveys, and \$250,000 for irrigation surveys. Of the sum appropriated for irrigation surveys, \$120,000 was diverted from that purpose by the Director and added to the \$200,000 for topographic surveys, making an aggregate of \$320,000 for topography, and leaving only \$130,000 for irrigation surveys and office and other expenses incidental thereto.

Your committee regards this as a plain violation of the statute and a misappropriation of money. It has been represented by the Director that a general topographic map of the arid region is necessary for an irrigation survey, and that unless it is made, the cost of that survey will be increased manifold. This statement it is impossible to comprehend.

It is, of course, easy to see that such a map would give useful information of a general kind and would be convenient for many minor purposes, but the engineers, while admitting this, testify with one voice that its usefulness goes no further; that such a map is not at all necessary in any imperative sense; that it will not save them any important amount of labor or expense; that the engineering surveys would be of the same character and cost the same whether they have maps or not; and that no use has been made of any topography by any of the engineers engaged in the irrigation survey except as a general map of the country.

A provision was inserted in the Act of Oct. 2, 1888, which is working a great hardship to the people of all the arid States and Territories. It was necessary to reserve all the lands which may hereafter be designated or selected by each United States survey for sites for reservoirs and ditches or canals for irrigation purposes.

As matters now stand, no entries can be made or titles perfected to any public lands of the United States requiring irrigation. Attention is called to this fact to show the importance of action on Senate Bill 2104, as reported from this committee.

The bill reserves the unappropriated waters of lakes and rivers on public lands for such beneficial purposes as shall be determined by the States and Territories where such waters are situated, subject only to the paramount authority of the United States.

It reserves the right of way for ditches, canals and other hydraulic works for irrigation

purposes, and allows the flowing to be diverted from their natural beds upon the arid areas.

It also reserves to the United States the adjudication of all questions that may arise in relation to storage conservation, flowing and distribution of all natural waters located at the boundary of States or Territories. It repeals all laws for the sale of lands where irrigation is necessary, except the mineral and homestead laws.

The bill also confers the power upon the Commissioner of Irrigation to regulate the amount of land which may be taken in a given locality by homestead settlers, not exceeding 160 acres. It further provides that when reservoirs, canals and other hydraulic works shall have been completed so as to irrigate all the land in a given district, patents may be issued to claimants of public lands in such district upon compliance with the laws in force at the time the claims were made, and also provides that when an irrigation district is formed in any State or Territory, and the laws of such State or Territory permit, legal voters residing in such district may tax the land of the State and of private individuals for the purpose of constructing such hydraulic works as are for the common benefit of all irrigable lands in such district.

United States lands therein shall bear the same burdens as are imposed on State lands and the lands of private persons, and homestead settlers who take such lands with irrigation works constructed for their reclamation shall take them subject to the payment of the same charges as have been paid by private parties for the same purpose; provided that the amount of such taxes shall be approved by the Commissioner of Irrigation, and that the United States shall not in any case be liable for any of such charges.

It further provides that the people of a district situated in two or more States, or in a State and Territory, may have the benefits of this Act by the joint action of all the States and Territories in which any portion of such district is situated, or in case any of the States or Territories refuse to join, then the State or Territory in which a large portion of the irrigable land is situated may perform all the acts necessary to enable legal voters to reclaim lands and secure the benefits of the Act.

The committee, believing that irrigation pertains to agriculture, and not to geology and other subjects under charge of the Director of the Geological Survey, and differing from the Director as to the mode of conducting such matters as relate to irrigation, has provided for the transfer of the irrigation survey to the Agricultural Department, and the appointment of a Commissioner of Irrigation in that department.

The passage of this bill, it is believed, will enable bona fide settlers and land-owners to develop the arid region by their united efforts. It will give full play to the enterprise of the pioneers of the West.

It avoids as far as possible Government interference, and frees the Government from the enormous expense which would be involved if the United States should undertake to supervise and control this vast region, as suggested by the Director of the Geological Survey. It also prevents the delay which would be occasioned by waiting for the expenditure of many millions of dollars in geologic and topographic surveys and in paleontologic, chemical and physical researches under the Director of the Geological Survey, and also avoids the embarrassment which would be imposed upon irrigation by charging to it the expenditures made by the Director of the Geological Survey for other purposes.

Minority Report.

Senators Reagan, Gorman and Jones of Arkansas say that, finding themselves unable to agree with the majority of the Senate Committee on Arid Lands, they submit a minority report. An analysis of the bill of the minority is made by sections and the effect of each section pointed out. The sections may here be characterized summarily:

Section 1 of the bill provides for the survey of arid lands into natural irrigation districts. Section 2 provides for the segregation of irrigable lands. Section 3 provides that lands already irrigated shall be declared irrigable for purposes contemplated in the bill. Section 4 provides that certain of the irrigation works shall be constructed only on sites designated and reserved therefor, in order to protect water rights and to conserve waters for beneficial purposes.

Section 5 provides for the division of waters among districts. Section 6 provides for the organization of districts situated in two or more States or Territories. Section 7 provides that non-irrigable lands shall remain in the possession of the General Government, as forests and pasture reservations, and catchment areas for irrigable lands, but it provides for the disposal of irrigable lands to homestead settlers in tracts not greater than 80 acres. Section 8 attaches water rights to the homesteads of irrigable lands. Section 9 makes it unlawful to construct unauthorized irrigation works.

Section 10 provides in general terms a plan for the organization of irrigation districts. Section 11 gives to the commissioners of irrigation districts authority to provide laws and rules for the use of waters belonging to the districts and for the protection and use of forests, and the protection and use of pasture. Section 12 makes it lawful for States and Territories to provide general legislation relating to the use of waters, forests and

pasture, and provides methods by which capital for the construction of irrigation works may be obtained.

Section 13 makes it lawful for States to provide a board of irrigation commissioners to supervise and approve the works authorized and contracts made by the district commissioners. Section 14 of the bill provides that cities and towns may be excluded from irrigation districts, and gives the States and Territories authority to designate the waters which such cities and towns may use. Section 15 provides a method for obtaining the consent of the States and Territories to the legislation proposed in the bill, and refuses the rights and benefits otherwise granted to any State or Territory which fails to give its consent.

The general effect of the bill is to turn over the control of irrigation to the States and districts. General statutes are to be made by the States and specific rules by the districts. Therefore it will accomplish local self-government in relation to irrigation and forest and pasture administration. It relieves the General Government of all subsequent legislative and administrative duties, except only to complete the irrigation survey of the whole and a survey of the irrigable lands.

The creation of a new bureau of irrigation in the Agricultural Department is unnecessary and unwise, therefore is not recommended. The director of the survey has expended a portion of the funds for necessary topographic work as part of the irrigation survey. This is strictly in compliance with the statute. The present irrigation survey is performing its duties in compliance with the law and in an efficient and thorough manner, and the work under it should proceed at a reasonable rate of progress until it is finished. It is estimated that the irrigation survey will cost \$7,000,000, but that in making maps it will save \$4,000,000 to the geological survey. Thus the real cost of an irrigation survey is but \$3,000,000 over and above the cost of a geological survey.

Comstock Mine Management.

The *Virginia Enterprise* says: The Comstock lode proper and its vicinity, created by the "influence" of the primal cause that formed the great ledge, is still as great a mining spot as there is on earth, and will entertain the mining energy of the world for the next hundred years.

Five-sixths of the incorporated institutions on this lode since 1878 have sold for far less than they could have been made to produce if decently managed, speaking without scruple about intelligent management. Capitalists can step into the San Francisco Stock and Exchange Board to-day and buy up a dozen mining properties at the ruling quotations, and clear all the way from 8 to 20 per cent a year on their investment and keep it up for a generation. There are exceedingly few favored spots on earth that can do better.

Why does mining not pay? The mining conditions on the lode are hampered with 30 years of gambling, of mismanagement, of more or less corruption, of experiments and non-eave. Paying ore is here in limitless quantities—the very same kind of ore from which dividends are paid the world over, excepting where they are worked under similar conditions as they are here. The men who are most deeply interested in mining operations could make more money on their investments working their interests as a farmer works his ranch, if they could get out of the old path and its fascinations. There is not a mining superintendent on the lode who would not have his life's desire if he owned the properties he superintends to the mere extent of what he could make out of them over and above expenses.

Taking it aside from the incorporated properties, this is a good section in which to invest money. There is room for a half-dozen big concerns to operate in Silver City, with every hope of fair reward. No man looking for a mine should overlook Silver City. There is hope of fair reward in Jumbo district, to the west of Mount Davidson. There is an inviting field to the northeast of the Sierra Nevada mine, and also northeast in the neighborhood of the Hendricks property. On the Brunswick lode, immediately east of the Comstock ledge, the prospects are most flattering, and it is only a question of a short time when it will be properly prospected. Very much now depends upon the success of the Occidental mine for this, and it is to be hoped that the ore will be given a fair chance. The recent development of ore in the Overman brings the American Flat section to the front as a fair field for investment.

HEAVY MINING SALE.—Advice from Oroville, Butte Co., state that the largest sale of mining property ever effected in the county has just been closed. The sale embraces the Cope, Union Cape and Greek Mining Co.'s property in the bed of the Feather river, commencing at the eastern boundary of this town and extending up the river nearly two miles. The upper portion of the ground was formerly known as Cape claim, and was mined in 1856, at which time \$1,000,000 was taken out. Only a small portion of the ground was worked, and that in a very rough manner. Major Frank McLaughlin made the sale and an English company is the purchaser. In addition to the mines the company will open vast tracts of country by a great irrigating canal, and create a great power adjacent to the place.

Mines of Lander County, Nev.

In a description of the resources of Lander county, Nev., published in the *Reese River Review*, we take the following paragraphs:

The two principal resources of the county are silver and the live-stock industry; the third resource being agriculture. The mines are principally located at Austin, Galena, Lewis, Bullion, Pittsburgh, Kingdon, Cortez, Mayesville, New Pass and Yankee Blade, with good prospects in every mountainous portion of the county. The Austin mines are mostly owned by the Manhattan Mining and Reduction Company of Chicago, with C. A. Pratt, Esq., as Superintendent, and as a part of the work a plant of five concentrators has been run for two years on the dump and waste rock that had been considered valueless for 20 years, at a profit of \$80,000 per year, or a total profit of \$160,000 for the company, besides half as much more to the laborers who were required in the work. There has also been large quantities of that celebrated ruby and black sulphure ore taken from the Union and other mines of this company, of which Lander Hill is so peculiarly celebrated, and with the unprospected ground between the Curtis and Frost shafts, delved into in the future, Austin will recover her old place among the large ore-producing camps of Nevada.

The Manhattan mines have produced over \$24,000,000 since 1865 alone, and the mines of the county not less than \$33,000,000 in the last 25 years.

The Galena Incorporated mines are now operated by a company, with A. G. Higbee as Superintendent, and it is intended to build a mill and work a large force of men this summer.

Many victorious and successful prospectors are engaged at Galena, outside of the main company, and their labors are being largely rewarded by handsome and paying returns.

Lewis, Bullion, Pittsburgh and Mayesville are situated in the northern part of the county, at which places are many mines of great promise, and which have produced large bullion returns, the Battle Mountain Silver Mining Company being the principal one at Lewis, W. H. Williams, Superintendent.

Pittsburg is controlled by an English company, of which Captain Seombe is Superintendent and Isaac P. Weaver book-keeper.

At Mayesville, Col. W. S. Wilson, whose pluck, business tact and energy are marvelous, has just completed a new mill, and the first five days run yielded over \$7,000 in bullion. The mines which Col. Wilson owns at Mayesville were discovered by him some few years ago, and the first 10 tons of rock taken therefrom and shipped to Reno netted Mr. Wilson over \$20,000, and the test just made of reducing the ores on the ground, makes it certain that these mines are to figure prominently in Lander county's prosperity in the future.

The Kingdon mines in the south end of the county, operated by General Spencer and John C. Irvine, promise large returns soon.

The New Pass gold mines were operated on a small scale last summer, after lying idle fifteen years, and produced the management of Starrett and Ramdohr over \$16,000 in gold bullion, and I have no doubt but that during the coming summer these mines, under the same management, will exceed the last year's results. These mines are situated in the extreme western portion of the county, some 25 miles from Austin, in the hills near New Pass on the old overland road.

Yankee Blade mines, some five miles north from Austin, have produced large quantities of the richest rock of any camp in the county, not excepting, we believe, Old Lander Hill; but the trouble at Yankee Blade is too much water. When machinery and money have been found to handle the water at Yankee Blade, handsome profits will be the result. Much praise is due Tim Connolly, Hank Easlin, W. E. Ford, and many others who have persisted in their confidence in these mines, and who have so long and patiently contributed their money and labor to their development.

The Patriot Mining Co. has just organized to work the Patriot mine at Yankee Blade, and is composed of Jefferson Hall, W. T. Hook, O. W. Hinchcliffe, O. B. Vincent, T. H. George, Andrew Blight, Jas. Rowe, Steve Buddie and P. T. Farrel. All these are residents of Austin, being prominent business men and practical miners. The machinery is being placed on the mine now, and we have no doubt but the labors of this company will be largely rewarded.

Two years ago W. J. Chamberlain & Co. of Denver, Colorado, erected sampling works on the railroad, six miles northwest from Austin, at Leslie Junction, under the management of W. E. West, which have contributed largely to the mining interests of both Lander and Nye counties, and should Congress be induced to enact any legislation favorable to silver, with the mines and appliances that Lander county has been given by nature, science and pluck—that pluck which is characteristic of the pioneer and miner all over the western coast, soon Old Lander would be that paradise for the miner so familiar from 1863 to 1878.

THE ANTHRACITE MINES.—It is interesting to iron workers to know that the present capacity of the Pennsylvania anthracite coal region will allow of an output of about 1,000,000 tons of coal per week; but for some time past less than half that amount has been mined, and once quantity terrible destitution exists among the miners. There are more miners than there is work for, even with a full output.

The Deep Gold Placers of California.

NUMBER VII.

[Written for the Press and Copyrighted 1890, by HENRY G. HANES, F. G. S. A., F. G. S.]

Elevations of Mountains and Geological History of the World in Brief.

In explanation of my theory, we must trace back the history of the earth as far as our limited conception can comprehend it; for it is utterly impossible for the human mind to realize the period of time over which the earth's history extends.

We must admit the creation of matter by an intelligent being, or assume it eternal and governed by laws also eternal.

The modern science of chemistry has taught us that matter is governed by fixed laws, the operation of which causes the incessant change upon which our existence is dependent. The idea of matter in perfect repose is inconceivable. Were there no elements there could be no compounds, no changes, and consequently no universe, no solar system, no life.

If we accept the nebular hypothesis, we may revert in imagination to a period when all matter now entering into the composition of the solar system was in an attenuated, gaseous state, which, condensing slowly, gave birth to the sun and planets as we now know them. During the period of evolution, elements reacted on each other to produce all mineral substances known and unknown. During the cooling of the earth (the only planet near enough to be examined closely by us) it was condensed, partly fused, shattered and patobed a multitude of times; the surface wrinkled and pliated, jagged and again. The mountains so formed, eroded by creeping ice and washed by rivers that no longer exist, were carried to oceans the beds of which now lie on the highest mountains.

Sediments in vast quantities, the ruins of the first formed crystalline rocks, augmented by animal and vegetable remains, were elevated and depressed many times, denuded and again river-washed to other ocean-beds, until a vast network of rocks was constructed, so numerous and so different in composition as to bewilder the most skilled lithologist of the present time.

The elevation of mountains assumed to be caused by the contraction of the earth's crust, was exemplified at the International Geological Congress, held at Paris in 1878. A common toy balloon was inflated and coated with wax; as the air or gas slowly escaped through the pores, contraction caused the wax to break and rise in ridges bearing a marked resemblance to chains of mountains. I have repeated this experiment in San Francisco with like results. It is easy to realize that similar contraction would cause great tension in a sphere as large as the earth. In rocks yielding to such a pressure, depressions as well as elevations would result; the contraction would not only cause fissures of greater or less magnitude, but the pressure changed to heat would create volcanic and solfataric energy. The same erosion, lake-bed excavation, formation of howlers, gravel and pipeclay, and other geological phenomena, have been, are now, and will continue in operation in many parts of the earth.

From a geological standpoint we may infer that these changes will eventually result in matter returning to its nebulous state to be created again as before.

All this is of great interest to the geologist, but it is the gold in the bedrock channels that make their origin interesting to the world at large, and to the people of California in particular.

The former theory that the deep-river channels on the sides of mountains and hills are wholly the work of the running stream, has been greatly modified in modern times. Since geology, by evolution, became an important science, it has been conceded that other forces acted in concert, some continuously and others at intervals, and that ice has been an active agent in mountain sculpture.

Hutton and Playfair maintained that all valley erosion was the work of rivers. Bakewell believed that elevation by subterranean forces would naturally leave an uneven surface down which rivers would afterward flow. Without elevation there could be no torrents. No river can erode a deep channel without placing its debris at some lower level, the position of which may be known.

Mr. Faray, an English geologist, advanced a theory that the surface of the earth was broken and deluged by the near approach of a comet.

There must be something fascinating about this theory, for it has been referred to by numerous writers. Donnelly, in his work "Ragnarok, the Age of Fire and Gravel," has assumed it, and attributes the gravel to the falling to the earth of comical matter from a comet's tail; but it would be difficult to convince a geologist that quartz howlers containing gold, and a till composed wholly of quartz, can be ultra-terrestrial.

Another theory by Pallas and Sir James Hall supposes a succession of inundations in the nature of tidal waves caused by earthquakes. Hall's theory assumed that if a sudden upheaval of an island as large as Sumatra should take place, a resulting tidal wave might lift glaciers from mountain-tops and place them in such a position that the melting ice would spread the drift on the surface as we find it.

The words denudation and erosion are used by geologists to imply the wearing away by natural causes of elevated portions of the earth's crust, and the placing of the debris in depressions. The effect of this, if sufficiently

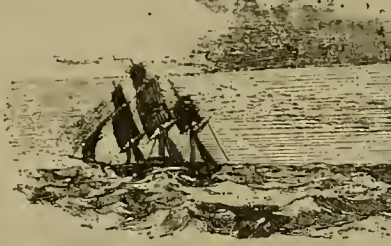


Fig. 8.—SEMI-CUBICAL ANTARCTIC ICEBERG.

long continued, would be to reduce the earth to a more perfect sphere and thus render it inhabitable; for the water would then cover the land, forming a universal shallow ocean. Subterranean energy, however, prevails, which again breaks the surface. The operation of these opposite forces causes phenomena the study of which is the science of geology.

The erosion of mountains is a favorite theme not confined to geological writers. The following is quoted from Cox's "Travels in Switzerland":

"What a chaos of mountains heaped upon one another, a dreary, desolate, sublime appearance. It looks like the ruin and wreck of a world."

The denudation of the highlands is a vast concentrating process, yet similar to the operation the gold miner performs in his humble pan. Heavy substances assume one position, light ones another. Thus magnetite, which at

forms; when, during a period of elevation, mineral veins fill accidental fissures, thermal waters gather from the fertile well-rocks the metalliferous minerals they contain and place them between the walls. Before flowing water can act on the rocks except superficially, they must be reduced to a pulp or at least crushed or coarsely pulverized.

There are numerous agencies engaged in the work of denudation, some continuous, others intermittent, but the principal ones are as follows, minor ones being disregarded:

(1) Glaciers, (2) landslides, (3) avalanches, (4) cloudbursts, (5) rivers, and waters in motion, (6) changes of temperature.

Glaciers.

To those who have no knowledge of the peculiarities of a glacier and are not familiar with the conditions under which alone one can exist, a brief description of them will be necessary before the theory advanced in this paper can be fully understood.

The reader must be prepared to take a broad view of the subject, and to admit that there is no condition of absolute rigidity in any form of matter with which we are acquainted. Fluidity and rigidity are comparative terms. Hardened steel and the most indurated rocks are to a certain degree fluid. This fact is strikingly apparent during an earthquake, or when one stands on the top of a slender stone column like the London fire monument, in a high wind.

But pliability and fluidity pertain to some forms of matter in a greater degree than to others. A scale of substances might be selected to illustrate these properties increasing in rigidity by successive steps, as oxygen, rhigolene, ether, alcohol, water, oil, molasses, tar, asphalt, and so on to the hardest rock. It is a singular fact that some substances so hard that they fly in fragments under a quick blow of a hammer, may be plicated with ease by slow movement. As an illustration of this the reader is referred to the confectioner, who breaks soft candy by gentle but quick blows of a small hammer.

A mass of common asphalt laid on a table in such a manner that a considerable portion projects, will very gradually bend at a right angle and soon commence flowing in an attenuated stream which will continue until all the projecting portion has piled up on the floor in the form of a bituminous stalagmite. If the tarry threads are taken in the hand they will be

is probably more common than known, might produce effects similar to those of a true glacier, or at least do its part in that direction.

The earth glacier is in no sense an avalanche or landslide, both of which sweep down the mountain-side expending their energy within a few minutes of time, but is a slow-moving mass of loose earth on an inclined bedrock; the lower portion being gradually removed by various causes, the mass with relentless force seeks a lower level, crushing and grinding yielding rocks in its path.

The following quotations from the Second Annual Report of the State Mineralogist, 1882, describe an instance of this nature I observed in Butte county, near Oroville:

"On reaching Morris Ravine I witnessed a strange sight. Here was a moving mass of earth miles in extent, governed in part by the same laws which apply to glaciers. When Hon. W. C. Hendricks commenced hydraulic mining in the stream ravine which has been singularly rich in gold, he met with snags. As he progressed, he noticed certain singular phenomena for which he could not account. On one portion of the claim the ground was found to have risen, while it had sunk on others. While piping to remove the auriferous earth, he did not seem to progress, or to uncover the bedrock to the extent expected, when at last it occurred to him that the ground was moving slowly forward, in proportion as the earth was removed by the powerful hydraulic stream. When he fully realized this, he watched more closely and found it to be a fact. Strange as it may seem, here we have many of the conditions of the glacier, but the yielding mass of matter is earth instead of ice. The gravelly deposit lies on a sloping bedrock the inclination of which is not great enough to produce a landslide, but sufficiently so to cause the flow, so to speak, in the direction of the least resistance, and this wonderful earthy glacier (if such a term is admissible) has crawled forward for years, and although the motion is invisible, it still continues and will continue until it reaches a point of equilibrium. While this is an interesting geological phenomenon, it has proved a great misfortune to Mr. Hendricks, who can see no hope of profit in washing away the surface soil, containing but little gold, which is replaced as fast as he can remove it. Here is a striking instance of the fact that common earth and rocks yield to the force of gravitation and pressure and move for considerable distances without the assistance of water, and without being fused as in the case of lava. This locality will become an interesting one to the geologist, and should be more carefully studied."

Another instance was observed in Cajon Pass, San Bernardino county, by Mr. Frank Kimball of National City. At the bottom of a railroad cut, the workmen came to a thin seam of very plastic clay, inclining toward the opening. As fast as they removed the earth at this point, the mass slowly descended like a ship on greased ways toward the water. It required the expenditure of much labor and capital to overcome this unexpected difficulty.

The following is from a recent newspaper: "DUNSMUIR, Feb. 7, 1890.—The supply train of three engines and a box car full of provisions has just arrived from below. The goods were carried over Tunnel 9. Roadmaster H. Cooley said it will not be possible to clear the slide at Tunnel 9 inside of two weeks. The whole face of the mountain has slid down, and as fast as the rock is removed, more slides in to take its place. This is the only serious obstacle below here. A slide from 10 to 20 feet deep and 100 feet long, full of trees, obstructs the track a mile above here."

Plasticity is possessed by ice to an eminent degree. A block of ice laid across a tightly stretched wire will be slowly cut through; the ice regeling as it passes the wire, and instead of being divided into two portions, it will remain seemingly a perfect block as before.

Geography and History.

What has been named by geologists the "Ice Age" was a glacial period, during which a sheet of ice extended over a large part of Europe and America. It is probable that this was owing to a gradual change of the poles of the earth. It is believed that there have been many ice periods, only the recent ones having left traces. The glaciers of Europe are supposed to be the remains of the vast ice sheets of a nearly extinct glacial period. This vast accumulation of congealed water was of varying thickness. In Norway it was 600 to 700 feet in depth, and 300 feet in the Scotch highlands. I have myself seen, far south of Cape Horn, ice islands floating in the sea which were broken from the end of a present ice sheet of the same character extending to the sea level as in the arctic region, but the bergs differ in form and magnitude from those of northern seas. One of these enormous semi-cubical antarctic icebergs has been figured by Geike and is reproduced here (Fig. 8).

According to Dr. Wilson (Annual Report Geological Survey of Canada, 1886), the Straits of Georgia were once occupied by a vast glacier, which would dwarf those of Switzerland. The glacier had a width of 50 miles. At its northern end its thickness was 3000 feet, and at its southern extremity 700 feet. Another glacier of similar area occupied Queen Charlotte Sound. There are living glaciers of great magnitude on both sides of the Stikine river which are of great interest. The glaciers of Alaska are on the grandest scale, but they have not been as carefully studied as they deserve.

(Continued on page 353.)

Fig. 9.—THE MUIR GLACIER FROM THE MORaine.

one time was disseminated in the crystalline rocks, forms beds of limonite and other as we find and utilize them. So the lighter matter, after giving up its alkali to water, becomes clay and argillaceous shales. Quartz, liberated by decomposition of granites, assumes the form of sand and sandstone, and still associated with mica, yields mica schist and gneiss. The accumulations of corals and marine shells in the seabeds produce limestones and dolomites. These are a few examples as an illustration of the many known to the geologist.

Fine sedimentary silts, under great pressure caused by contraction, become slate, having sometimes vertical cleavage, although deposited in horizontal strata.

The waters of the sea, into which nearly all land streams flow, gathered soluble salts from decomposing earthy minerals, which were in part precipitated by superaturation, and returned to other forms to the sediments which eventually became rocks of a different character.

These new composite rocks contain many elements and compounds in ever-changing

found as hard as the original. This is given as an illustration, but all known substances without exception possess this property to a greater or less extent.

In the streets of San Francisco the bituminous pavements afford an interesting object-lesson for study; the ever-creeping asphalt may be seen to possess properties similar to those above mentioned, and to be governed by the same laws that set the glaciers in motion, and thereby produce remarkable geological changes. Although on a cold day this material will break like glass if struck with a hammer, on a warm one, although in a literal sense solid, it will slowly flow down any accidental decline and overflow the glass dead-lights in the sidewalks, the surface assuming a corrugated appearance, resembling in miniature the fissured surface of a glacier.

Earth Glaciers.

While this term is manifestly incorrect, it is not easy to find a more suitable one, and it must serve its purpose to convey the meaning intended. This geological phenomenon, which

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

KENNEDY.—*Ledger*, May 17: This mine is looming up as one of the strongest and most prosperous mines in the county. The last sinking shows the ore body to have widened out to splendid proportions, and if it continues to expand below the present depth in the same ratio, the Kennedy will rank as one of the foremost gold-producers of Amador. The rock is of excellent grade; the last cleanup, so it is reported, surrendered over \$40,000.

SAVING SULPHURETS.—Mr. Gates has secured the right from the Kennedy Mining Co. to erect sulphurets and gold-saving apparatus below the Kennedy mill, for the purpose of working the tailings. He pays the company \$50 per month for the right, and also a small rental to the owners of the Volunteer, as some of his works will overlap that claim. He is now at work placing his apparatus in position. It is a simple method, and will consist chiefly in running the tailings over canvas-covered boxes embracing an area of nearly 3000 square feet. Mr. Gates formerly caught sulphurets on the same plan at the Governor mill. He also erected similar works at the Hathaway mine, Placer county.

MISCELLANEOUS.—R. B. Reed, of the Reed & Askey mine, returned from a long visit to S. F. a few days ago. He reports having succeeded in disposing of a sufficient interest in the property to enable him to surmount all monetary embarrassments. He expects the parties up shortly to look at the property and close the bargain. The Amador gold mine has finally disposed of the dispute regarding the right of way over the Doyle ground. On Saturday they paid Doyle \$2000 for the privilege to allow the track to remain where it is, simply straightening it at the lower end if necessary. The suit pending in the U. S. Circuit Court to enjoin the company from using said track has no doubt been dismissed ere this.

Calaveras.

THE TONE QUARTZ MINE.—*Cor. Calaveras Chronicle*, May 16: This mine is situated one mile south of Dive Lampson's ranch, near the head of Nelson's gulch. The mine is owned by John Tone, a well-known San Joaquin county farmer, and French Miller, a miner of considerable experience. The ledge is tapped by a tunnel at a depth of 200 feet, which shows a well-defined lead of high-grade ore four feet in width. The ledge on the surface, as far as prospected, has a pay chute 800 feet in length. There is now a force of men building a hoarding-house and also grading for an 18-stamp mill, and soon will be running in full blast.

THE COLUMBIA QUARTZ MINE. owned by Messrs. Jones & McCormick, has resumed operations, but no sinking can be done, as the machinery on the mine is not large enough to handle the water. It is the intention of the owners to put new and larger machinery on the mine and work it in a business-like manner. This is a valuable mine, but owing to litigation among the former owners, has lain idle for several years.

El Dorado

LIVELY.—*El Dorado Republican*, May 15: The liveliest mining camp in this county is now in the neighborhood of the Taylor mine near Garden Valley. This mine is now in the hands of the Chapman Bros. of San Francisco, who are the owners of extensive drift mines in Sierra county. Under contract with the owners of the Taylor mine they have been sinking during the winter and erecting a fine mill on the property. The mill will be completed some time in June. It will have 20 stamps at first, but it is planned to contain 40, and the additional 20 will be added if the mine proves equal to the expectations of those working it. The shaft is down between 500 and 600 feet, and a large amount of ore has been taken out on the dumps. In places the ledge is 30 feet wide. The company has been at work all winter in spite of the inclement weather, and has a good reputation in the neighborhood, paying all debts promptly, we understand. The Esperanza, a mine in the same neighborhood, owned by N. D. Burlingham, is bonded by San Francisco parties who are sinking the shaft. This mine, like the Taylor, has a very large body of quartz which will employ a company many years if it is put on a paying basis.

TAYLOR.—*Georgetown Gazette*, May 15: Work is being energetically pushed at the Taylor mine, and it is a safe bet that the present company will develop it into a permanent and paying mining enterprise.

GOLD MINES.—Our gold field will receive more attention from mine-hunters this summer than for many years past. Paying gold mines can always find a purchaser and such properties can certainly be found here.

Inyo.

BORAX.—*Inyo Index*, May 14: The works at Searles' marsh are turning out the usual quantity of that salt. John W. Searles, superintendent and principal owner of the property, is making constant improvements in the works and processes of manufacture in use, whereby he has been able to economize both labor and the raw material and also produce an article of superior excellence and the highest commercial value, the refined borax from this marsh commanding extreme prices on the London market. The outlook for the borax industry on this coast is now considered good.

PANAMINT.—*Inyo Index*, May 11: Reaching Panamint, Dr. DeGroot reports more life in the business of mining, and this, for the reason that the conditions are more favorable. Not until this point is reached is any wood met with, the mining districts for a hundred miles south until Black Hawk is reached being absolutely treeless, as well as deficient in water. Striking Panamint, the pinyon begins to come in, water also being more plentiful, both increasing somewhat as we come north. The strike recently made in the Minnieta mine at Lookout, Dr. DeGroot considers to be one of great importance, the ore being of good grade and the find being marked by features of permanence. Although there is no notable activity at Darwin, mining there is in a healthy condition, much high-grade ore being extracted and shipped to Keeler, the greater portion being consigned to the Selby Lead and

Smelting Works at Selby, near San Francisco. The character of the mines here and the districts adjacent is sufficiently denoted by the wages paid miners, the regular rate being \$3 50 per day, from 50 cents to \$1 per day more than is paid generally throughout California, or anywhere else on the coast except in the Comstock mines. With the improved prices of silver and lead a prosperous future evidently awaits the mining industry in this section of California.

CERRO GORDO.—*Inyo Index*, May 14: John Anton came in from Keeler on Tuesday. Cerro Gordo is bound to come to the front at an early day and it is intimated that not less than ten carloads per week will be the early ore shipment from that camp alone. The Union Co. is hiring men as fast as they come along, and rumor says that the Dunphy & Keefe mine has been bonded, if not purchased, by Nevada capitalists.

Nevada.

IDAHO MINE.—*Grass Valley Union*, May 17: The drift in the new ore body recently found on the 17th level of the Idaho mine has been extended a distance of 60 feet, and crosscuts have been run at several points to determine its width. As the work has progressed, seams of wall rock have been found between the layers of quartz, and the indications are that the pay ore may run out in no great distance. On the floor of the drift, however, the vein holds strong and has the appearance of going down, and even if it gives out in the drift the sinking of a winze may prove it goes down, and be as strong in size and prospect as well as it has been doing for several weeks past. Appearances are that the ore body is taking a westerly dip, which, if correct, would bring it nearer the shaft in sinking another level. It will necessarily take some time to obtain definite information of the extent or value of the discovery, but so far it has prospected remarkably well.

HARTERY.—The water in the Hartery shaft has been lowered to the drift below the present working level, and it is proposed to open the level on which but little work has been done heretofore. The shaft is sunk to another level below this, but the ground has never been opened. The present working level is No. 2 below the adit level, where the vein is showing about two feet, and the ore of a good milling quality. The shaft of the North Star mine is to be sunk to the 20th level with as little delay as possible. The work of putting the Gold Hill mine in shape for regular operations has been commenced in good shape. Good progress is being made in re-tilting and pumping out the Homeward Bound shaft. There is a good deal of water in the ground, but the pumps are making headway against it easily. It is contemplated to commence the sinking of a shaft on the Wisconsin location forthwith. This claim parallels the Homeward Bound, and is a portion of the Menlo property. It produced rich ore in former times, but has not been worked in many years.

RIDGE ITEMS.—*Nevada Transcript*, May 17: There are rumors that efforts will be made before long to reopen the very extensive gravel claims at Cherokee (Patterson postoffice). There will be no infraction of Judge Sawyer's anti-debris decisions, but the drifting process will be pursued. The Cherokee claims include about 400 acres of as good-paying ground as has ever been opened. Once in operation, they would give employment to a large number of men and sustain a community of thousands. The stretch of country from Badger hill to Cherokee, two miles or more across, is one vast bed of auriferous gravel, every rod of which will pay for working. The matter of devising ways and means of working these claims is now under consideration by some well-known mining men, and will hear good fruit in the near future.

DELHI.—Now that the snow is all gone, the Delhi mine near Columbia hill is being worked to the full capacity of the mill. It is the only quartz mine of consequence on the ridge that has yet been developed to a regular operating point. There is nothing too difficult in the way of mining for Robert McMurray to tackle. The resumption of work at the Delhi mine, of which Mr. McMurray is principal owner, makes matters lively at Columbia hill, where most of the employees reside.

BOSS.—The Boss quartz mine near North San Juan, owned by Messrs. Crane, Gaynor, Buhning and others, is again being worked. The rigors of the winter caused a suspension of labor there, but now the main shaft is being pushed down again. It is down some 80 feet. It is the intention to sink on the lode as far as is possible with the facilities available in order to thoroughly test the character and value of the formation. The owners are confident the mine can be made to pay.

JERSEY SLIDE.—Across the Middle Yuba river, at a point known as the Jersey Slide ground, George Archer & Co. are running a long tunnel into the hill for the purpose of striking, if possible, the channel of an old river which must at one time have been the outlet of a very large stream, but which, through some great convulsion of nature in the dim and misty past, slid off. The south part of the old slide was worked 30 years ago by a company known as Van Ness, Taylor & Co., who in a short time took out many thousands of dollars, but soon exhausted the gravel. Since then other parties have worked farther into the hill with varying results. Finally a few years ago George Archer, J. S. McIntyre and another party whose name cannot be recalled just now relocated the ground. They did well for a while. Recently Archer got entire control and is now working there. His prospects are good. The claim is worked by ground-sluicing. At Sweetland the bedrock of the old Manzanita claim is being worked, giving employment to quite a force consisting principally of young men.

NEW SHAFT.—*Tidings*, May 17: Supt. Wiltsie to-day instituted work on a new shaft on the Wisconsin ground, embraced in the Menlo property. Surface workings on this ground in the early days yielded richly, but nothing has been done since 1859. It is expected to find good ore at a depth of 75 or 100 feet. A 12-inch combined pumping and hoisting engine will be placed on the shaft.

HOMEROUND BOUND.—The work of cleaning out the Homeward Bound shaft on the same property is progressing very satisfactorily, and Mr. Wiltsie is showing himself well qualified to cope with all emergencies. His decision and prompt action in connection with the work on the Wisconsin ground certainly stamps him in addition as being a man of energy and determination. The operations of the syndicate represented by Judge Calkins of Chicago have commenced in earnest. The tunnel on the

Lafayette No. 2 is being reopened, and machinery and lumber for the Ben Franklin are being hauled and the work of erection forwarded.

NEW MINES.—Our people do not fully realize that work is progressing on nine new mines in this district, viz.: Gold Hill, Peabody, Emmett, Evening Star, Menlo, Crown Point, St. Johns, Lafayette and Wisconsin. The Idaho could not be more full of promise; from 50 to 100 additional men will be put on at the Empire before long; the Omaha and Lone Jack is prosperous, and the North Star will soon be paying dividends again; the W. Y. O. D. never looked as well as now; the Coe will not long remain idle; the North Banner gives more promise than ever of proving a great mine; the Pittsburg, also tributary to Grass Valley, is looking very well; developments are being pushed at the Hartery and half a dozen movements to open old and new mines are on foot. Work has been resumed on the Brunswick, and the Gold Point will soon start up. The outlook in this richest of all quartz districts has never before been so pregnant with promise. It is rumored on the ridge that the 400 acres of hydraulic mining ground at Cherokee is to be opened by the drifting process, and it is stated that the work will certainly pay. The indications are that the new ledge in the Idaho, which has been opened upon for a distance of 60 feet, has taken a western dip, which will bring it nearer to the shaft in sinking another level.

Placer.

MAYFLOWER.—*Placer Argus*, May 17: Mr. Chappellet says that the Mayflower M. Co. have paid out over \$1,000,000 at Forest Hill, during the last 13 years. The hullion yield has been over \$600,000, but the work in developing the mine is pretty well completed. The mill will soon resume work, as pay gravel has been struck in the south drift.

THE DRUMMOND.—*Herald*, May 17: Mr. Wm. Werry, the well-known quartz-miner, in conversation with a representative of this paper stated that he had resigned his position as superintendent of the Drummond mine, owned and operated by Hon. F. Reed, and that Mr. Hanchett, a man of large experience in the management of mines in the States of Nevada and Colorado, has been employed as his successor. Mr. Werry spoke very flatteringly of the comparatively new mine. He said: "In leaving the Drummond mine I left one of the leading mines in the State. It is bound to be a very large producer of bullion. While the ore is not of a high grade, there is an immense body of it, the vein being large and very extensive. It is another Idaho; like the Idaho of Grass Valley. When I first took charge of the Drummond the ore paid only \$2.70 per ton, and when I left the value of the ore would average about \$8 per ton. The mine paid under my administration, with one Huntington mill, all expenses of opening and a little surplus, and with two mills it ought to pay a handsome profit, ore enough being in sight above the No. 1 tunnel to run two mills for three years to come, crushing 40 tons per day. During the time I had charge I run another tunnel, or crosscut, so as to tap the vein still lower. This lower tunnel is called tunnel No. 2. Enough ore can be taken from No. 2 to run the two mills three years. Crosscuts can be run below No. 2 to tap the vein at a depth of 1200 feet. I regret that other enterprises in which I am interested seemed to make it necessary for me to resign, but I have faith in the ability of my successor. About 1000 feet from the Drummond ledge is a parallel vein running east and west—the Drummond ledge running south of east and west of north—and I am confident that the two ledges will come together, thus forming a very large body of ore. Very rich rock has been taken from the second lode on which but little work has been done as yet, proving conclusively this of itself is a big mine. This parallel lead is called the Eclipse, also owned by Mr. Reed. Specimens of ore from the Eclipse can be seen at Freeman's hotel, which were taken from the bottom of the shaft at a depth of only 80 feet. The mills are now run by steam, but can be run by water-power if necessary, which shows that these mines can be handled very economically. In conclusion let me tell you that the size of the ore body, its quality, the surroundings and conveniences for working make it another Sierra Buttes mine in location and production."

Shasta.

WAGON-LOAD OF BULLION.—*Shasta Courier*, May 17: We once described the Lost Confidence mine on Iron mountain near town as a vast crucible filled with silver and gold ore. The results obtained in working and prospecting the mine so far carry out the correctness of our designation. Yesterday our attention was called to a two-horse wagon-load of silver bullion brought down from that mine, en route for shipment to San Francisco for refinement and sale. The load consisted of 20 bars of silver bullion, pretty well refined, and aggregating 2500 pounds in weight. This we learned was the result of one month's run of the Lost Confidence mill. We think one ton and 500 pounds over of bullion is a pretty good month's run, and a good showing and indication of the mineral wealth of Iron mountain.

Siskiyou.

GOLD.—*Yreka Journal*, May 15: The miners at Hawkinsville are taking out considerable gold-dust lately, in having a good supply of water from the Big Ditch, now bank full all the time. The other ditches on Yreka flats are also furnishing an abundance of water, so that every claim on Greenhorn and Yreka flats to Hawkinsville can be worked to the best advantage. John Boyle of the Humburg quartz mines had his mammoth and ponderous quartz-wagon on our streets last Saturday, taking it over to Humburg for hauling quartz to his new Huntington quartz-mill, almost in readiness to start. Spencer & Co. of Humburg creek are now engaged in getting out quartz and bailing it to the McCook mill at Forks of Humburg. The Heckathorn quartz from Greenhorn, now being crushed at the Warren quartz-mill, on Yreka flats, is expected will pay at least \$17 or \$18 per ton, provided some rich specimen quartz has not been overlooked, as a very little of such quartz would run the average up to \$30. The owners of the mine always take out the specimens showing gold to the naked eye, for pounding out in a band mortar, to pay running expenses while waiting an opportunity for milling. The Quartz Hill Co. at Scott Bar will soon lay a water pipe across Scott river, for running their quartz mill, the former water pipe having been carried away with the Scott river bridge, during the

winter flood of last February. It will be laid across the new bridge. Schroeder & Werner of the Deadwood creek quartz mines have a force of men busily engaged in fixing up the wagon-road from their mine to mill, which was badly washed out by the flood of water last February. The snow is about all gone where the sun's rays could strike, but there is about five feet still remaining in the shady places, and where sheltered by groves of trees. These enterprising miners expect to have their mill in operation within ten days, and believe they will do better this season than ever before.

NEVADA.

Washoe District.

SIERRA NEVADA.—*Virginia Chronicle*, May 17: On the 030 level a southwest drift is advanced 591 feet from the shaft station. Formation, clay and porphyry carrying water.

UNION CON.—On the 1465 level from the north lateral drift, opposite west crosscut No. 4, east crosscut No. 1 is advanced 398 feet, continuing in porphyry now showing some water.

MEXICAN.—On the 1465 level west crosscut No. 4, 100 feet south of No. 3, from the north drift from west crosscut No. 1, from the main north lateral drift, is extended 255 feet and stopped.

OPHIR.—On the 1300 level in working southwesterly from the top of the raise carried up 28 feet above the south drift from the end of the east crosscut from the shaft station, following the ore streak found in the raise downward, 27 tons of ore were raised to the surface, the average assay value of which is \$24.50 per ton.

CON. CALIFORNIA & VIRGINIA.—The 1300, 1500 and 1600 levels continue to yield the usual quantity of ore. During the week extracted 2753 tons and 540 pounds from the above-mentioned points, all of which have been shipped to the mills. Shipped to the Morgan mill 1138 tons and 680 pounds of ore and to the Eureka 1624 tons and 1860 pounds; battery sample assays showing an average value of \$22.75 per ton; [2881 tons milled.] Bullion valued at \$12,840.70 shipped to the Carson Mint, and about \$30,000 on hand in local assay office.

BEST & BELCHER.—On the 1000 level the north drift is cleaned out and repaired 688 feet.

GOULD & CURRY.—On the 400 level the north-west drift from west crosscut No. 1 is extended 50 feet. Formation, hard porphyry with small streaks of quartz.

OCCIDENTAL CON.—Continue to extract ore of good quality from the stopes on the 400 and 450 levels. The 650 level main north drift is extended 10 feet through low-grade quartz.

ANDES.—A 420 level west crosscut 160 feet north of the shaft is in 20 feet, continuing in clay and quartz seams in the face. The 350 level west crosscut is extended 227 feet, the face still in porphyry.

SAVAGE.—Shipped 450 tons of ore, showing an average value of \$23.10 by battery sample assays. The raise above the 750 level has connected with the 650 level workings.

HALE & NORCROSS.—A 500 level east crosscut is advanced 166 feet, and continues in porphyry and quartz. Shipped 1070 tons of ore during the week, showing an average value of \$19.60 per ton by battery sample assays.

WARD COMBINATION SHAFT.—The 1800 level east drift is out 350 feet; the face continues in porphyry.

CHOLLAR.—Extracted 462 tons of ore, battery sample assays showing a value of \$21.40 per ton.

POTOSI.—On the 930 level the winze is down 110 feet. The bottom is in porphyry with bunches of quartz. The raise above that level is up 145 feet. The roof is in porphyry.

ALPHA.—The 600 level east crosscut is in 82 feet and continues in porphyry. The 600 level south drift is out 61 feet, the face in clay and porphyry.

EXCHEQUER.—The 600 level north drift is out 287 feet, and continues in quartz and porphyry.

CON. NEW YORK.—The 650 level west drift continues in low-grade quartz. The 960 level south drift is in low-grade quartz.

IMPERIAL.—The 750 level west crosscut No. 3 is in 99 feet, the face in low-grade quartz.

YELLOW JACKET.—Shipped 500 tons of ore showing average assay value of \$21.75 by battery sample assays.

KENTUCK.—Still sinking the winze below the 950 level.

CROWN POINT.—Shipped during the week 809 tons of ore, showing an average value of \$20.99 per ton by pulp assays.

CONFIDENCE & CHALLENGE.—The raise above the 300 level has connected with the 200. The top is in low-grade quartz. The joint Imperial 800 level west crosscut No. 1 is in 218 feet, the face in soft porphyry. The joint Imperial raise above the 500 level is in low-grade quartz.

BELCHER.—The 200 level south drift is out 318 feet and is in porphyry and low-grade quartz. The 300 level west crosscut is in 195 feet, the face in soft porphyry. The 850 level joint east crosscut is out 431 feet, the face in soft porphyry.

SEG. BELCHER.—The 850 level Belcher joint east crosscut is in 431 feet, the face continuing in soft porphyry.

JUSTICE.—During the week crushed 198 tons of ore, showing a value of \$26.25 per ton by battery sample assays. The raise above the 622 level continues in low-grade ore.

ALTA.—The ore output this week was 320 tons, showing an average assay value of \$22 per ton by pulp assays.

OVERMAN.—Shipped 328 tons of ore during the week showing an average value of \$23.41 per ton by battery sample assays, of which \$14.13 was gold. The northwest drift continues in low-grade quartz. The incline winze is down 28 feet below the 1200 level. The ore in the winze is mixed with porphyry.

Cottonwood Canyon District.

THE CAMP OF SANBORN.—*Central Nevadan*, May 16: Sanborn is located in what is known as Cottonwood canyon, but in early days was known as Anderson creek. The Lucky Dog, or Hope mine, as it is now called, is 1700 feet above the town of Sanborn, at an angle of 40 degrees. The superintendent has ordered a tramway to carry the ore from the mine to the mill. The mine will produce from 40 to 60 tons of ore ranging from \$20 to \$50 per ton and often ore of a higher grade. The mine is under the management of Wm. Woolcock, said to be one of the best miners in the State. The mill is under construction, it being two four-foot Huntington mills,

our pans, two settlers, two concentrators with plates for gold, the ore carrying from \$6 to \$36 to the ton in gold as per assay. Good judges of machinery claim that it is one of the finest mills ever brought to Nevada, outside of Virginia City. The superintendent, D. N. Brown, expects to have the mill running in the month of July. The camp has quite a lively appearance. Friday, May 2d, was the company's first pay-day. They commenced operations about April 2d. They distributed \$1200. Altogether the prospects are flattering, and we believe it will be a successful and a good purchase for the Michigan company.

Buena Vista District.

THE ARIZONA.—*Central Nevada*, May 16: The new mining district is situated in the southeastern part of Humboldt county, about four miles south of Unionville. Here in Buena Vista mining district are located some of the best mines in the State, and the once-renowned Arizona mine, that has already yielded \$7,800,000, is again coming to the front. Here also are the Huascar, Peru, Jackson, Millionaire and other first-class lodes that need only capital to make them paying properties in a very short time.

Central District.

ORE.—*Silver State*, May 16: Charley Wright arrived from Central District last evening with a lot of ore from the Millionaire mine, which is being worked by A. H. Ruse. The ore is rich in gold and silver, and will be shipped to Argo, Colorado, to be worked.

Jumbo District.

CRUSHING ORE.—*Virginia Chronicle*, May 14: The Dunlop stamp mill in Jumbo district has been crushing ore from the Wild Goose mine since last March and a cleanup of gold bullion will be made in a few days. The blizzard location in that district is being worked by the owners, Messrs. Woods and Willis. The Pandora is also producing ore and the Josephine and other locations are being prospected.

Red Mountain District

GOLD QUARTZ.—*Virginia Chronicle*, May 14: A vein of gold-bearing quartz has recently been discovered in Red Mountain district, about 12 miles north-east of Six-mile canyon. The vein lies in burned volcanic rock, on the mountain from which the district derives its name.

Reese River District.

THE PATRIOT MINE.—*Reveille*, May 13: The Patriot Mining Co. begin pumping out the water from the mine to-morrow. Everything in and around the hoisting works is in perfect order, and a trial has been made of the engine and pump, which were found to work most satisfactorily. Seventy-five cords of wood have been provided which will be more than enough to get the water out, the estimated time for which work being from 20 to 40 days. P. T. Farrell, S. Buddel, T. George and A. Blight move out to the mine to-day. J. Rowe will reside in town for awhile, going out daily. All parties interested in this mine are sanguine of success, and we sincerely hope they will not meet with any disappointment. The Patriot mine has yielded something like \$200,000 from the upper levels, and as there is known to be good paying ore below, it is fair to presume that no one interested will lose anything on the venture.

ARIZONA.

BRADSHAW MOUNTAINS.—*Journal-Miner*, May 14: The Crowned King mill is having a long and successful run. The fine stamp and concentrating mill of the Oro Bella Company is running almost constantly on ore from the well-known Gray Eagle mine, which the company recently purchased. Under the direction of Supt. Helm, the mill is doing excellent work, nearly all the gold and a high percentage of the silver being saved. Less than \$1 in gold is left in the tailings, and one day last week assays failed to show that even a trace of the precious metal was lost. Large quantities of ore are already opened up in the mine, and a substantial three-rail gravity tramway is being constructed from the mine to the mill. The 20-stamp mill of the Ryland Gold M. Co. is running steadily, and the company's mine is yielding vast quantities of low-grade ore in the lower workings of the mine, it is reported. Ex-Sheriff Henkle is running a crosscut in his Rapid Transit mine, which is expected to soon strike the rich ledge, which he has already opened by several hundred feet of tunnel. The important development of pay ore in the Del Pasco property, formerly owned and abandoned by Diamond Jo Reynolds, is very satisfactory to the finders, Messrs. Bashford & Burmister, and shows the possibilities of mining. It is understood that the results of experimental work on an extension of the old Tiger mine were not such as to encourage further development.

COLORADO.

A CAMP BIRD STRIKE.—*Aspen Times*, May 13: An important strike has been made in the Lever lease on the south end of the Camp Bird. Ore has been found before in this lease but it has either been low grade or small in quantity. Now, however, the mine is showing 6 feet of ore that will average close to 75 ounces per ton.

THE FLOODED MINES.—Nothing new has developed in connection with the flood in the mines on the lower part of Aspen mountain. Sunday the water lowered 12 feet in the lower levels of the Aspen Mining & Smelting Co., having found a fresh outlet into the Enterprise. Monday it rose again and was soon several feet higher than it had been before. The flow appeared to be much heavier on Monday than it had been before. It was expected that the flood would soon find an outlet into the Little Nell and Juniata and that those properties would be completely submerged.

A \$51,000 PAYMENT.—*Manager Dunbar* Wright of the Park Regent mine will to-day pay for A. W. Hawkins to Henry Devereux \$51,000 to apply on the purchase of Mr. Devereux's interest in that mine. This property is producing about \$3000 per day and has about four-fifths of its territory yet unexplored, after having produced over \$1,000,000.

THE BUSHWHACKER.—The regular daily shipments of ore worth from \$500 to \$800 are kept up from the Bushwhacker mine. The proceeds of ore sales and stock sales has enabled the company to pay off some \$30,000 of claims during the past month. Manager Yankee returned from Denver yesterday, and will immediately assume personal

management of the development of the properties of the company.

NOTES.—A 10-ton lot of ore has been brought down from the Monte Cristo on Maroon creek. It is expected to run about 35 ounces silver and 25 per cent lead. A late telephone message from Manager Fore of the Little Rule, states that the recent discovery is looking better and better and work progresses on it.

DAKOTA.

ORO FINO.—*Deadwood Pioneer*, May 14: The Messrs. Swift, to whom the Oro Fino is bonded, will accompany J. K. P. Miller on his return to Deadwood and with him are due to arrive here on Friday or Saturday of this week. The gentlemen come to personally examine the property, and until their arrival stamps in the mill will continue to drop. Whether or not they determine to buy, present operations are to cease early next week.

BUCKEYE HYDRAULIC.—*Spearfish Register*, May 13: G. A. A. Paul of the Buckeye hydraulic works came down yesterday after supplies. The flume has all been put in good working order and work at piping commenced Thursday. The boys have water enough to run steady, and propose to utilize it as far as possible. At present they are running two 12-hour shifts, which will be changed soon to three 8-hour shifts.

FLOAT.—Late reports from the Glendale tin mine and mill are that the mill is working satisfactorily, and the yield from the ore is reasonably good. The mill consists principally of a Gates crusher, Cornish rolls and Frue vanner.

IDAHO.

BULLION.—*Ketchum Keystone*, May 12: Ore shipments have begun from the Idahoan and one or two other mines in the Bullion region.

SAWTOOTH.—Encouraging reports come from Sawtooth and Germania Basin and shipments from those regions will probably exceed those of 1889 in first-class ore.

RELOCATORY.—A great many locations are being made on the northern end of the Camas granite belt, consequent from the strike in the Croesus. No sooner was the snow gone from old holes than the relocatory was on hand.

THE CARRIE LEONARD.—This mine is under lease, to parties who have recently struck some ore, causing quite a little excitement in that locality.

LAKE CREEK.—James D. Cochran came down from Lake creek Wednesday, having been at work on his old claim there known as the Argonaut, in the group of mines bearing the same name. Mr. Cochran is one of the many miners in this upper country who report their prospects looking much better than usual, and feel that the time for greater profit in working them is at hand.

GOOD PROSPECTS AHEAD.—*Boise Statesman*, May 16: Never in the history of the country have the prospects for a successful mining season been so bright as at present. Yesterday there appeared in the *Statesman* a partial account of the mines of Owyhee county, which for a long time was reckoned the richest in the country and stood very high among mining operations in New York City. Under such men as J. C. Kemp, Van Ee and Capt. J. R. DeLamar, who direct their efforts not to booming and selling so much as taking out the precious metals, there is no doubt but that the good old mine will return. The only drawback to the Seven Devils country has been the want of means of transportation. This has been obviated by the construction of a steamboat which will ply upon the waters of the Snake. The same means will also avail in developing the Mineral district. Washington county has many neglected mines, among which are several of mica, which will not long be allowed to remain idle. In Elmore the people are fairly impatient for the spring to open. The people at Rocky Bar anticipate a doubling of population over last year. Atlanta, one of the best mining districts on the Pacific Slope, expects to resume her old position as a queen among mining districts, while the tales from Neal sound like the adventures of Sindbad and the diamond cavern. Banner district will boom. Work will be pressed vigorously on the bedrock flume, and the various placers in and about the Basin, with plenty of water, will be worked for all they are worth. Where are all the workmen to come from? They will have to be imported. For the first time in many years there are not laborers enough in the country. Lloyd Sherman, from Salt Lake, says that efforts have already been made to induce men to come from Utah to Idaho for that purpose. The season has but just commenced and but few of the mines are being worked. As soon as the bulk of the snow shall have disappeared from the mining camps, the demand for labor will be increased. Idaho can support double the population it could three years ago because the mines are better developed and the soil is four-fold better irrigated.

LOWER CALIFORNIA.

ALAMO AND CEDROS.—*Lower Californian*, May 9: J. W. Perry returned Monday from a short trip to Alamo, during which he inspected most of the leading mines in camp. He said: "Compared with the deep mines of California, which penetrate from 500 to 2500 feet, Alamo is only a prospect. Its indications are all favorable for going down deep. Most of the veins strengthen with depth, and a fairly rich mine at 100 feet is reasonably certain to carry more gold at 200 feet. The very even formation and character of the country rock point to a steady going down of all the leading veins. Another thing, much of the ore pronounced rebellious is absolutely free milling, with perhaps the exception of a little sulphurets not worth saving. One of the mines presents rock at 60 feet that is the exact counterpart of certain quartz in Amador county that is perfectly free. I was kindly shown by Supt. Rodda over the Princessa Co.'s properties, and so far as developed they are certainly good. No one need exaggerate about Alamo—the truth is good enough at present, and if the development now going on is successful the camp will jump to the first rank; and then, too, the truth will be good enough. I think there are undeveloped parts of the Peninsula that will equal Alamo." W. P. Lyle, in charge of the Lucas mill in Mexican gulch, crushed 44 tons of Viznaga ore, finishing last week. Col. W. S. Kerr was here last week. His mill has been running steadily and

satisfactorily on custom ore. The El Paso mill is now running on Elsinore rock, which pays well. The Princessa mine is in pretty hard rock but manages to yield its share of gold. The Princessa Co.'s mill is running constantly, turning out the yellow bricks week after week. Hoisting works are being erected on the Telmaco, under the supervision of Mr. Argyll, the foreman. The Penelope is down about 70 feet on a good vein and drifting will soon begin. Placer mining is still carried on to a limited extent. A good deal of work has been done in the flat between the St. David and Lane's mill, where there is plenty of water.

CEDEOS ISLAND.—The schooner Ethel, with 560 sacks of ore, cleared Saturday for San Diego. On Tuesday the Nettie Sondberg arrived and cleared, having on board 77 tons of ore. All this goes to the National City reduction works, which is running night and day on Cedros Island ore. Jonas Anderson, one of the discoverers of gold on the island, came up on the Nettie. He has been there six months, and is pretty well posted. He says the Cedros Island Co. has one ledge 25 feet wide carrying \$80 ore, and that it is developing into an old-time bonanza. Timber is easily obtained, and he claims that for \$500 enough water can be developed to run a 20-stamp mill. He speaks favorably of the ground covered by the Banes concession, and says the Nativity and several smaller islands are included in the same gold belt, and will without doubt prove interesting to prospectors. Up to the present time nothing has been done in that line.

PEARL.—*Lower Californian*, May 14: Frank Gallegos of the Pearl mine at the Real, is in town. He has run a tunnel 80 feet, 50 of which is on the ledge, and it discloses a fine vein of ore. The other mines at the Real are temporarily idle, though Gen. Ryerson is making arrangements to start the San Nicolas mine and mill. Capt. Henry Cook has hit the town from San Isidro, where he has been in charge of the gang of men working on the Tepusete iron mines. He will return next week with supplies for a force of 100 men, and work will begin in real earnest under Supt. M. D. King. The Colonization Co. seems to have abandoned the work of prospecting for coal in the canyon of the Carmen.

MONTANA.

A GOLD DISCOVERY.—*Mining Journal*, May 16: It is claimed that a gold discovery of considerable importance has been made near Silver Bow Park, at Butte. Samples of black sand containing gold were recently exhibited in that city which were found a few feet below water level and which assayed \$350 in gold per ton.

THE PHILIPSBURG SMELTER.—Frank J. Wilson is corresponding with various concerns regarding the cost of a smelter for Philipsburg, and is now in possession of several letters on the subject, giving instructions and prices complete, says the *Mail*. Mr. Wilson says there is already \$7500 subscribed by a few men in town for the construction of these works, and there remains no doubt whatever that the smelter will be built the present season.

THE GRANITE'S OUTPUT.—The output of the Granite Mountain for the week ending May 8th was 47 bars of bullion, containing 72,635 ounces fine silver and 148 ounces fine gold.

PHILIPSBURG SHIPMENTS.—Philipsburg shipments of silver bullion for the month of March amounted to 361 bars, weighing 51,563 pounds, valued at \$488,849.67, not including gold, which would raise these figures to \$500,000.

WEGNER NO. 2.—The tunnel on the Wegner No. 2, at Philipsburg, struck the ore body a few days ago at a depth of 50 feet, and Thursday struck the hanging-wall, after running through 20 feet of quartz, every pound of which is pay rock.

THE BALTIMORE.—Negotiations are under way looking to the purchase of the Baltimore, near Butte, by a company of Montana capitalists. The property is owned by Sam Mackey of Argentina.

THE OHIO, AT THOMPSON FALLS.—E. J. Field of Thompson Falls, superintendent of the Ohio mine, reports continued improvement in the property. During the past few weeks shipments have been made to the Grant and Omaha smelter at Omaha. The ore shipped runs from 60 to 121 ounces in silver, and from 16 to 20 per cent in lead.

NEW MEXICO.

HANOVER.—*Silver City Enterprise*, May 16: Fourteen men are at work for the Illinois Zinc Co. at Hanover. Shipments of ore are being made regularly and as development progresses new and extensive ore bodies are being opened on the different claims. For a brand-new company they are meeting with great success. The superintendent in charge at the mine is Col. M. Twomey. The Anson S. copper mine is fast coming to the front, and although work was only started two weeks ago, it is now in the front rank among the producers. M. W. Neff, who is working the mine under bond and lease from Dr. Stephens, is personally superintending the work.

PIÑOS ALTOS.—C. G. Bell and J. I. Brown are pushing matters on the Tampico mine at Pinos Altos. They have leased the Bremen mill for a test run, amalgamating plates have been put in and the mill started crushing ore this morning. Mr. Brown devotes his time and attention to the superintendency of the mill, while Judge Bell is in charge of the mine.

GLADSTONE.—The Gladstone mine, situated about five miles from Paschal, is now being developed by Bailly, Woodward & Co. The mine was worked years ago and considerable high-grade ore shipped and large bodies of pay ore but of lower grade left standing in the mine. The shaft is 130 feet in depth and will be sunk to 250 feet, when development by drifting will be commenced.

OREGON.

PIPING.—*Jacksonville Times*, May 20: The Wadleigh mine near Waldo is operating four pipes and uncovering lots of ground. J. Dyser of Wolf creek is employing three men at piping in his mine. The rain this week increased the water supply and will prolong mining operations somewhat. A number of the miners are engaged in cleaning up and considerable gold-dust is being taken out. M. Mansfield, W. R. Mansfield and P. R. Wallis each located claims in the Applegate district last week. Cameron & Ennis have suspended piping

at their Galice creek mines for the present, and will repair the ditch damaged by last winter's storms, expecting to be able to pipe several weeks longer thereby. The famous old Fowler ledge in Steamboat district is liable to be heard from in loud tones again in a short time, as most favorable reports come from there of rich prospects. It has always been a mystery how the ledge ran out so suddenly after turning out so many thousands of dollars in gold, and expert miners have long been of the opinion that the pay streak would be found again. E. S. Smith has been superintending a force of men there for the past few months, who are now well into the mountain, in the interest of the new owners, Jonathan Bourne and J. B. Hammond, who have bought out Griffith & Co.'s interest in the mine. A big strike in that section would do much to revive confidence in the quartz ledges of Southern Oregon, and we trust their best hopes may be realized.

UTAH.

THE ANCHOR BORING MACHINE.—*Park Record*, May 17: Contractor Dull got his rebuilt boring machine in working order the middle of the week and made a favorable start to pit down the eighth inch hole from the bottom of the shaft to the tunnel level, a distance of about 600 feet. Mr. Dull has several Pennsylvania oil-well boring men assisting him. If nothing of an unfavorable nature occurs they will be able to put down the bore in from 30 to 40 days.

THE CONCENTRATORS.—The Union concentrator will commence custom work for the season on Monday morning with its capacity for treating ore to a high degree of perfection greatly increased. The Crescent concentrator commenced operations for the season on nearly 400 tons of Nevada-Northland leasers' second-class ore, and it will all have been run through and a cleanup made this evening.

CAMP CROSSCUTS.—The Daly has commenced shipping ore to the Mackintosh sampler. Surplus water is interfering considerably with the working of several of the leading mines, but this trouble will soon cease. The No. 1 side of the Ontario mill has been put in working order again after having undergone needed repairs and overhauling. The Apex is undergoing developments of a favorable nature, and a large lot of first-class ore is on the dump ready for shipment to market. Several more of the embarrassing lawsuits in which the Morgan Mining Co. is concerned have been dismissed, and some good news from this quarter may be looked for in the near future. During the week the Mackintosh sampler received and forwarded 734,120 pounds of Ontario ore; 428,170 of Mayflower No. 7 leasers'; 226,000 of Daly, and 45,200 of Nevada-Northland leasers' ore; total, 1,433,490 pounds. The foundation is being laid at the No. 2 shaft of the Ontario for a large new air compressor, and when it is in readiness sinking will probably be resumed in the shaft to the 1400-foot level.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

BELVEDERE LAND CO., May 16. Capital stock, \$500,000. Directors—Geo. Bargate, T. B. Valentine, Chas. Forbes, Edgar M. Wilson and Curtis H. Lindley.

CALIFORNIA RAISIN CO., May 17. Capital stock, \$150,000. Directors—C. Christensen, A. V. Towas, N. Ames, J. H. N. Tum Suden and M. C. Theilmann.

CALIFORNIA VENEER WORKS, May 17. Object, to make veneers of ornamental California woods. Capital stock, \$200,000. Directors—P. and J. H. Hurlbut, N. and H. N. Hoffmann and J. H. Wilson.

WOMEN'S EDUCATIONAL AND INDUSTRIAL UNION, May 19. Object, increasing fellowship among women, and to promote their welfare. Directors—Margaret Deane, Hannah M. Solomon, Jean Parker, Emilie E. Kirketerp and Abbey Cheney.

SOUTH FRESNO IMPROVEMENT CO., May 21. Capital stock, \$70,100. Directors—D. and F. E. Bacon of Oakland, E. E. Bush of Hanford, John A. Merrill of San Leandro and F. A. Berlin of San Francisco.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none out worthy men.

J. C. HOAG—San Francisco.
R. G. BAILY—San Francisco.
SAMUEL CLIFF—San Luis Obispo Co.
C. J. WADDE—Cucamonga, Cal.
W. W. THORNTON—Los Angeles and Orange Co's.
E. B. TAYLOR—San Joaquin Co.
JOHN B. HILL—San Diego Co.
E. H. SODARFELT—Chaveros Co.
FRANK S. CHAPIN—Colusa Co.
J. H. R. BOYCE—Alameda Co.
W. B. FROST—Merced and Stanislaus Co's.
GEO. WILSON—Sacramento Co.
T. M. SKAGGS—Sierra Co.
H. KILLEY—Modoc Co.
IL B. PARKER—Del Norte Co.
WM. H. HILLIARY—Oregon.
R. O. PARSONS—Oregon.
R. G. HUSTON—Montana.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, term of subscription, and give it their own patronage, and as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

A CAR LOAD of base bullion from the smelter at Spokane Falls was shipped to Newark, N. J., last week for refining. The ore comes from Colville, Wash., and there is enough to sight to ship a car-load every four days.

MECHANICAL PROGRESS.

Mechanical Foolhardiness.

Carelessness kills more mechanics than old age or disease, and the number of accidents resulting from somebody's carelessness cannot be estimated.

There is not as much danger in doing risky jobs and undertakings as there is in the everyday risks which are met with a contempt hrought about by a long acquaintance therewith, and which are hardly regarded as risks by the men who take them.

The architect takes risks which are needless when he guesses at the strain to be overcome by a beam or truss, and doubly so when he also guesses at the strength of that beam or truss. The builder in turn takes a risk when he passes defective construction with the guess and the hope that "it will hold."

In driving piling for a block of houses in Harlem, the writer noticed that some of the piles were driven twelve to twenty inches by the last blow of the hammer, and he wondered at the risk taken for the sake of saving a few dollars.

In building a railroad bridge in New Hampshire, the contractors put down piling where the last blow drove some piles four feet! Some were driven too far, whereupon the rascally contractors pulled them up again until they were in the required position.

In erecting buildings, hundreds of risks are taken by the workmen and by the builders also. In erecting machinery risks continue to be taken, and after the machinery is running it seems almost as if the attendants vied with each other in courting danger.

Begin with the fireman. How many times will he risk his life by "guessing" that the safety-valve is in perfect order. All too often he will "guess" that his boiler is safe, and run with leaks, corrosion, and he knows not what else, in that straining iron shell under which he shovels coal.

Why is all this? We may well ask. Is the man a lunatic, a fool, or what is the matter with him? There are just two other causes which may affect his behavior, or he may be lazy or avaricious; then he is a villain as well.

The architect was lazy; he didn't figure because it was easier to guess. The builder who drove the piling was a knave. He did this to make more money out of the job; the workman who got maimed or killed, the fireman who lets his safety-valve get stuck, is sometimes a fool, but more often these things happen through pure laziness.

The engineer who almost bawls exposes himself by walking under the expand belt from his engine, is lazy; but he is shetted in his laziness by knavery, in the shape of an avaricious owner, who grudges the few dollars necessary to hex up the dangerous place, and thus relieve the lazy man's temptation.

Lazy men run all sorts of risks in putting on belts, in fooling around moving machinery, and in monkeying with circular saws, planers and molders. The man who crawls around exposed machinery to oil or clean the same, when he can just as well stop the machine before exposing himself, deserves to be sent up for ten days for every offense. Only a few days since, a party of masons were building a 100 foot mill chimney. They had got up 18 feet when all at once the whole party were on the ground among bricks, mortar and splintered lumber, with two of their number seriously hurt.

An examination showed that in nailing on the last course of ledgers only one nail had been put into some of the posts, where six should have been driven—a clear case of laziness and foolhardiness combined.

Sometimes this carelessness becomes criminal, and is occasionally brought to justice, and lately, where knavery is the cause of accident, it has been frequently severely punished. There is no excuse for exposure to such accidents, and every man can educate himself out of it if he will.

Familiarity is one great cause of a man getting careless and lazy. He works around machinery so long without accident that he thinks he knows all the ins and outs, all the dangerous places and death-traps; so he will not bave to be so continually on his guard. It is a good deal of work to keep his thoughts on his fingers all the time, so our man gets a little lazy, goes too near a quick-running belt, and the first thing we know he is a subject for the surgeon or undertaker.—Condensed from Boston Journal of Commerce.

METAL DECORATION.—The new process of decoration and color printing on metal consists, says an exchange, in preparing zinc or other metallic plates in a special way, and then either nickel-plating or coppering them, a dull or bright surface, or both, being produced by mechanical agency. Specially prepared enamel colors are used, and the printing of the subject on the plate is carried out direct from stones, as in lithography. Embossing is introduced, either in the lettering or in views and such like, this part of the treatment being effected by another special detail of the process, the usual steel-plate engraving being dispensed with. The cost of production is said to be very small.

PROFITS OF LAKE SUPERIOR IRON ORE MINING.—Most of the Lake Superior iron-ore mines are paying large dividends. In some cases the profits in two years have equaled the capital

stock of the companies. These profits are generally considered phenomenal—too great for a long continuance. If they do continue, says the *Iron Age*, the situation will soon be changed by offers of more ore than the market can take, forcing prices down to an unremunerative level, and banishing for a time the hope of even small dividends. The agencies actively at work to cause this are the new mines which are being opened and the extensive preparations by old mines to greatly increase their output. If the decline in the price of pig iron indicates a depression in that trade of some duration and severity, the stockholders in mining companies have reason to look forward with apprehension, which will temper their rejoicing over the heavy dividends now in hand.

Speed and Work of Emery-Wheels.

The first and most striking characteristic of the solid emery-wheel is its enormous speed. By common consent the speed of about a mile a minute for a point upon the circumference of the wheel has been adopted. The recent increase from one mile to nearly two miles is accompanied by an increased cut, but the result is extravagant in cost, as the wear of wheel increases out of all proportion to that of metal. Few wheels can be safely run at such a speed. Running at the standard speed, the emery-wheel is equivalent to a file one mile in length passing over the metal in one minute. The hand-used tool of ordinary work at the vice-bench is equivalent to a file only 60 feet in length passing over the work in one minute. To make this comparison strictly true, the metal and the wheel must be in continuous contact for the minute. The necessary condition, apparently of general occurrence is really seldom found, and is most difficult to secure, even in lathe-turned emery-wheels. It is by no means an easy task to center them perfectly upon the grinding machine, and many workmen do not center them at all. The hole apparently fits the spindle, and they trust to that. The wheel is started, the iron melts away visibly, a comet-tail of sparks flashes across the shop. The man who sees a continuous stream of sparks fly from the emery-wheel deludes himself with the idea that he has a tool which is continuously at work. Such a man is surprised when an expert stops the machine and shows him that his wheel is hot and glazed for perhaps one-fourth of its circumference, but cold and apparently untouched for three-fourths—that he has, in fact, utilized but 25 per cent of the machine's possibilities.

What are the causes of this? Possibly the wheel was not round to start with; possibly it was not properly centered. But there are some causes not so evident and still a matter of doubt. Possibly the wheel material was not homogeneous, and expands unequally under frictional heat. Possibly, owing to the lack of homogeneity, the metal adhered to and glazes one part rather than another. Possibly, owing to the light weight of the machine and the unsteadiness of floors, an irregularly regular vibration is set up, and the wheel and work part rhythmically. Undoubtedly the high spot formed by adhering metal shoves back the piece being ground, and a large wheel-surface revolves unused before work and wheel are again in contact. The remedy is to use those makes of wheel which glaze the least, for glazing, by making high spots on the wheel, prevents all possibility of continuous contact and steady work.

The solid emery-wheel is a rotary file, which runs a mile in a minute, and whose cutting points never grow dull. This is said only of the perfect wheel, though glazing is one in which the points may be dulled. In experimenting with many makes of wheels, a curious difference is seen in their tendency to glaze. In some, the metal adheres to all parts of the surface, and finally becomes a continuous bronzed ring; in others, the metal gathers in patches. Certain makes, however, may be considered practically free from these faults under all general conditions, a slight shininess of surface being the only visible indication, while deterioration of cut is manifested only under very light pressure.—*Franklin Institute Journal*.

A NEW METHOD OF BRONZING.—Some German artisans have introduced a method of bronzing iron or steel surfaces in such a way as to prevent the possibility of rust. The object to be acted upon must be free of all oxidation or other impurity, and is exposed for two or three minutes to the vapors of a heated mixture of hydrochloric acid and nitric acid, in equal proportions, at a temperature of from 550° to 650° F. After cooling, the objects are rubbed over with vaseline, and again heated until the vaseline begins to decompose; this treatment with the vaseline is repeated once. Should a lighter coloring be desired, it is produced by mixing acetic acid with the other acids.

RAILROAD TIES OF FIRE CLAY.—Adams P. Hopkins of West Bridgewater, Pa., has filed a caveat upon an "improvement" in the form of posts and railroad ties made of burned fire-clay. The posts will be burned hard, and will have the railing secured by means of nails driven into holes made in the posts, when soft, at an angle that will bring the heads together and hold the railing firmly in place. Holes through the ties upon either side of the rail will admit bolts, the upper ends of which will have washers and nuts bearing upon the rail and holding it firmly in position.

SCIENTIFIC PROGRESS.

The Grand Possibilities of Africa.

Nothing in the way of geographical discovery, since Columbus gave a new continent to the world, has been of equal importance to Stanley's discoveries in Africa. Moreover, in this era of rapid progress in industry and art, the results of the present discoveries will be utilized more fully in a decade than were the discoveries of Columbus in a century. Says the *Age of Steel*: It is but a question of a few years when the Congo will be an eastern Mississippi, with its contributory factors of railway, etc. As a chapter in evolutionary history the march of Stanley may be a modest approximation to the voyage of Columbus, in a future of African development and civilization. The last continental stronghold of barbarism will be carried by commerce and Christianity, and old Europe, with its idle millions and its crowded markets, will find an outlet for what it may spare of men and money. It is to be hoped that this latest addition of real estate to the notice of Europe will, by some such arrangement as the International Association, inaugurated by the King of Belgium, be not a bone of contention between rival nations, but an opportunity unexcelled of much that will be a blessing to New Africa and prosperity to Europe.

Stanley regards the basin of the Congo as a veritable land of promise, with a commercial future on a line with that of the Mississippi. Eight hundred miles of railroad would open up 22,000 miles of river-bank on four great rivers and inaugurate a commercial relationship with 80,000,000 people. Immediate use could be made of such produce as wood, gums and ivory, while the possibilities of mineral deposits and agricultural development are as yet practically beyond computation. As we have said, European enterprise will have a new field and the more opportune and providential the outlet for its energies and trade, as the western hemisphere and its archipelagoes must eventually be absorbed in the commercial dominion of the dominant republic. The future of European trade lies in the East, and what has become an actuality in India may be realized in Africa.

THE CAUSE OF COOKING IN COAL.—It may sound scarcely credible to some student of pyrology and gas technics, but it is nevertheless true, that the physical cause of the caking or fusing of bituminous coal into the form of coke, under a distilling heat, is by no means understood. An attempt has been made by some German chemists to connect the physical phenomenon of caking with the chemical composition of the coal, especially with reference to the richness of the coal in what is called disposable hydrogen, or that proportion of it which is in excess of the quantity required to form water with the oxygen present. Unfortunately for the general acceptance of this standard for the caking quality in coal, it does not correspond with observed results. Neither does the richness of a sample of coke in carbon determine its caking capability; for two specimens of coal of practically identical carbon composition will often be found to behave very differently in the retort of coke ovens. If the property of caking does not reside either in the surplus hydrogen or the fixed carbon, it is certainly not to be found in the content of the coal in oxygen, which gives no indication whatever of the physical behavior of the coal under heat. Some caking coals coke without much swelling; others swell considerably in the process of caking. In either case, the coal must undergo a stage of fusion, in which it becomes a thick, semi fluid mass through which the gas escapes. Why one kind of coal should swell considerably while another variety, of similar composition, does not, is a problem not apparently capable of solution from any of the chemical data usually preserved in analyses of coals.—*Journal of Gas Lighting*.

THE DIRECT CONVERSION OF HEAT INTO ELECTRICITY is one of the certain things in the future. Even Edison has staked his reputation upon such an assertion. As showing that actual progress is already being made in this direction, attention is called to the fact that Mr. E. H. Acheson, an electrical engineer of New York, is conducting experiments having for their object this desideratum. In his experiments the energy of the converted heat acts directly on the engine through the dynamo, thus reducing the work done by the equivalent of this transformed heat, or in other words, increasing the capacity of the plant by this amount. The *Iron Age* of New York says that a gain of 35 per cent in output, boiler and engine capacity remaining constant, has already been realized. In trials which have been made by other engineers with Mr. Acheson's system, 1 electrical horse-power per hour has been developed with 11 cubic feet of natural gas per hour, while a plant of ordinary efficiency to-day requires not less than 50 cubic feet of gas per horse-power per hour developed. Mr. Acheson will continue his experiments in the hope of attaining still better results than the above.

THE SCIENCE OF EMBALMING.—Our present methods of embalming are so superior to those of the ancient Egyptians that a modern embalmer might leave a human body so perfect that, after 3000 years, says the *Lancet*, "not a lineament need he wanting for identification, while the embalmed bodies of the ancients were so soon dried up as to be utterly beyond all

possibility of recognition. Modern emhalmers are, moreover, constantly adding new and desirable features to the art, which are useful either in cases where delay in burial is needed, or for the permanent keeping of the body."

CHEMICAL EXAMINATION OF AN ANCIENT SCEPTER.—M. Berthelot has recently discussed the question of the manufacture of bronze by ancient peoples. As copper is widely distributed in nature, the use of that metal might have been expected. Tin, the other constituent of bronze, is, on the contrary, found in but few localities, and even these are of comparatively difficult access. The positive statements, therefore, which have hitherto been made concerning the general use of bronze by prehistoric peoples, have for a long time puzzled those who have given the matter attention. Archaeologists agree that the use of unalloyed copper for arms and utensils preceded that of bronze, but the date of the introduction of the alloy of copper and tin has never been satisfactorily settled. Among the many so-called bronze implements contained in collections of Egyptian antiquities, one, the scepter of Pepi I, a king of the sixth dynasty, archaeologists have agreed belongs to an age between 35 and 40 centuries before the Christian era. From the interior of this scepter some small fragments of the metal were dislodged, and sent by the director of the British Museum to M. Berthelot. An analysis of these particles failed to indicate the presence of even a trace of tin or of zinc. From this M. Berthelot argues that bronze was unknown at this epoch, as otherwise it would have been used in this instance instead of the softer copper. He comes finally to the conclusion, based upon this and other proof, that the art of bronze manufacture has not been known at any rate for more than from 50 to 60 centuries.—*American Chemical Journal*.

A MOVING MOUNTAIN.—A traveling mountain is found at the Cascades of the Columbia. It is a triple-peaked mass of dark-brown basalt, six or eight miles in length where it fronts the river, and rises to a height of almost 2000 feet above the water. That it is in motion is the last thought which would be likely to suggest itself to the mind of any one passing by; yet it is a well-established fact that this entire mountain is moving slowly but steadily down the river, as if it had a deliberate purpose some time in the future to dam the Columbia and form a great lake from the Cascades to The Dalles. The Indian traditions indicate immense movements of the mountains hereabout, long before white men came to Oregon, and the early settlers, many of them immigrants from New England, gave the above-described mountains the name of "traveling mountain," or "sliding mountain." In its forward and downward movement, the forests along the base of the ridge have become submerged in the river. Large tree-stubs can be seen standing deep in the water on this shore. The railway engineers and trackmen find that the line of the railroad which skirts the foot of the mountain is being continually forced out of place. At certain points, the road-bed and rails have been pushed eight or ten feet out of line in the course of a few years. Geologists attribute this strange phenomenon to the fact that the basalt, which constitutes the bulk of the mountain, rests on a substratum of conglomerate, or of soft sandstone, which the deep, swift current of the mighty river is constantly wearing away; or that this softer subrock is of itself yielding, at great depths, to the enormous weight of the harder material above.—*Astorian, May 7th*.

"POGONIP."—It is said that the mountain regions of Nevada have a climatic phenomenon called the "Pogonip." It is a sort of frozen fog that fills the air at times in winter. It often appears on the clearest and brightest days, coming suddenly from no one knows whence. In an instant the air is filled with floating needles of ice. To breathe the pogonip is death to the lungs. When it comes, people rush to cover. The Indians dread it as much as the whites. It appears to be caused by the sudden freezing in the air of the moisture which collects about the summits of the high peaks.

DISINTEGRATION OF ROCKY STRATA.—If sodium sulphate be allowed to crystallize between plates of unglazed porcelain in the open air, and if the crystallization be reproduced two or three times by sprinkling with water, the plates fall to powder. The same phenomenon is observed with very hard stones. This crystallization may be the cause of the comminution of rocks which resists water.

A NOVEL TELEPHONE, invented by an American, has for its primary feature the transmission of sound by the vibration of glass. From a glass diaphragm extend a number of glass tubes of various sizes communicating with an ordinary wire. Very clear and distinct utterance has been found to result on trials over a line three miles long.

A NEW MINERAL has been discovered in the vicinity of the little town of Homer, Ky., and the inhabitants of that place expect to realize millions. The substance discovered has a black, pitchy formation, and is of a loamy appearance. When placed in the fire, it burns with a clear, steady flame and makes a brilliant white light.

GOOD HEALTH.

Health Throughout the State.

Reports have been received by the State Board of Health from 100 localities in the State with an estimated population of 825,000, which indicate a very favorable condition of health for the month of April. The month was characterized by an entire absence of epidemic disease. The very favorable weather that prevailed seems to have had a beneficial effect upon the general health of the State. The deaths have reached only 13 per thousand—a very low rate.

Whooping Cough.

Whooping cough, as a malady, has not been prevalent, only four cases having been reported, is, nevertheless, a malady which should be better understood and guarded against. The report speaks of it as follows, quoting from the *Sanitary Record*:

Whooping cough is too often regarded in the light of a trifling and unavoidable malady, and it rarely happens that the slightest precaution is taken against its spread by infection. Some amount of blame, moreover, attaches to medical men, who, in many cases, fail to insist upon the necessity of isolation and disinfection. Yet the live contagion of whooping cough is not less active, distinct and subtle than that of scarlet fever or smallpox. As in many other affections, although the number of deaths as an immediate result of the disease is of itself great, yet it may be doubtful if the remote mortality is not much greater. The strain on the delicate lung tissues leads to emphysema and other grave complications that often prove fatal after the lapse of many years. Meanwhile, let parents be taught to regard this scourge in a truer light, by avoiding the bringing of their children in contact with the disease where it can possibly by diligent inquiry be ascertained to be present.

Cerebro-Spinal Fever

Was the cause of seventeen deaths during the month—an increase over the previous report. The report, after alluding to this disease as more serious in character than remittent and intermittent fevers, continues as follows:

"In connection with these zymotic affections we cannot but regret that the example of Minnesota is not followed in this State. There the law requires that in the month of May, or oftener in each year, the Health Officer shall make a thorough sanitary inspection of the city, town, or village under his jurisdiction, and present a written report of such inspection at the next meeting of the Board of Health, and shall forward a copy of such report, as soon as rendered, to the State Board of Health. This wise provision of the law has been followed by the most salutary results. It gives the Health Officer a complete knowledge of the sanitary conditions of the town, and in case of an outbreak of disease he is in a position to know its probable cause, and is thus quickly enabled to use the means necessary for its suppression or extinction, to the saving of many lives and the great monetary interest of the community."

Cancer.

We notice that cancer was the cause of 32 deaths. The number of deaths from this cause last month was 44. Large and increasing as are the fatalities from this malady, the Board of Health is studiously silent in regard to it, although we will guarantee that a few hours special observation in this city would satisfy the Board that quite a number of patients are discharged here every month as cured, after they have been pronounced afflicted with cancer by one or more of the physicians and surgeons in this city. A large number of such patients have been thus cured after ineffectual attempts have been made to eradicate the disease with the knife in the hands of our leading surgeons. This malady is rapidly increasing, and has already reached near the head of the list of fatalities. So important is this matter considered, and so apparently indifferent are the health guardians to its increase, that a number of our leading philanthropists and several well-to-do people, who have been cured, after failing to get relief from the regular faculty, are seriously contemplating the establishment of a cancer hospital in this city, where proper care can be taken of people so afflicted. If such an institution should be established, there is no doubt but that it would result in arresting the rapid increase of this terrible malady with which the regular faculty are entirely unable to cope.

A TEST FOR MALARIA.—A loving father, who, at a summer resort last season, had left behind him four beautiful children, dead of diphtheria, said to me, "That hotel proprietor was as much a murderer as if he had shot my little ones." Yes, dear sir, but you, the guardian, ought to have been armed and equipped against such foes. An hour's intelligent examination of water supply and drainage at a proposed country home would, in a large majority of cases, prevent the risk of such a catastrophe, and might be made before a landlord could object. Take in the dressing-hag an ounce vial of saturated solution of permanganate of potash, which any druggist will prepare for a few cents, and put half a dozen drops into a tumbler of drinking-water that is supplied. If it turns brown in an hour, it is, broadly speaking, unfit to drink; if not, it is not especially harmful.

fnl. If a country hotel's sewage system is confined to cesspools within a hundred feet of the house, and near the water supply, take the next train to a point farther on. These matters should force themselves on one's personal attention, quite as much as the undertaker's bill that occasionally follow their neglect.—*American Magazine*.

USEFUL INFORMATION.

A MACHINE FOR HARVESTING BEANS is the latest addition to agricultural machinery. In raising beans for the market on a large scale, every consideration of profit and economy demands ready facilities. In a bean field of 20, 50 or 100 acres, it would require a large force to do the pulling by hand and collect the vines in piles preparatory to hauling in to the thrashing floor. The machine, which is the invention of John Yocom of Ridgetown, Ont., Can., is adapted to be drawn between two rows of beans by one horse, and diverging blades tear off the plants at the roots and crowd them outwardly toward the outlying rows. The next trip being made between the next contiguous rows, the effect is to hustle two rows together, and the driving being done in every third space, the work progresses very rapidly. The implement is handled like a cultivator and is just as easily operated.

NEW PROCESS AND MATERIAL FOR MAKING PASTE.—Messrs. Gustav Turk & Witting Bros. of London, England, have a valuable process for making adhesive paste from the straw bolls that accumulate in the manufacture of paper. This paste can, by the process, be purified, and will be found a cheap and efficient substitute for gum arabic. The water having served its purpose in boiling the straw, is drawn off and sent through a coarse filter, then reduced by evaporation, and forms a stiff brown paste which can be evenly spread on any substance, and which will not ferment. This feature is most valuable, as ordinary paste very quickly becomes foul and deteriorates rapidly. Considering the many thousands of barrels of paste which are used every month throughout the country, this new material, made from what has heretofore been a waste product, may be considered a valuable and economic substitute.

BLUE FLAME DRIFTWOOD.—A new fad is being introduced at the East in the shape of colored flames for parlor wood fires. A Boston paper says that a demand for fuel burning with various-colored flame has been created wherever the so-called "blue-flame driftwood" has been exhibited and used. This driftwood comes from seaport towns, where old coppered ships are broken up. The timber becomes saturated with the copper acted upon by sea-water, and when used in the fire-place, burns with brilliant colors to the flame. This has led to an artificial substitute called iridescent fuel, and the process has been patented by a Boston company, which proposes to sell the right to manufacture throughout the country. Either wood or coke may be used.

LEATHER FROM BEECHWOOD.—Dr. George Tenina of Vienna has a process for the manufacture of artificial leather from red beechwood. The heat wood for the purpose is taken from 50 to 60 year old trees, cut in the spring, which must be worked up immediately, bark peeled off, steamed, treated with chemicals in a kettle under pressure, and exposed to several more operations which the inventor does not mention, as he wants to have them patented. From the prepared wood, strong and thin pieces are made by means of pressure. The inventor states that solid sole leather can be obtained, which he claims is superior to the animal leather in firmness and durability, and can be worked up in the same way as animal leather, nailed and sewed.

A MOST WONDERFUL TOY has been on private exhibition in Paris. Fancy seven life-sized kittens covered with real skin, but with eyes of emerald set in pearly white enamel and each playing on a musical instrument—a flute, a zither, a violin, a drum, a harp, a cornet and an accordion, all perfectly harmonized and playing the most difficult operas—then you have the picture complete. The mechanism is similar to that of a music-box, and the whole apparatus, kittens et al., is valued at 20,000 francs.

SPIRIT PHOTOGRAPHS have been produced by being first painted upon a screen with a solution of sulphate of quinine or any fluorescent substance, which will be quite invisible by ordinary light; but if the ultra-violet rays of the spectrum are allowed to fall upon them, they become visible at once. Owing to the great actinic power of these rays, a photograph of such a screen will show these invisible characters upon the finished plate. Certain mysterious "spirit photographs" have been produced in this way.

GLASS SPINNING and glass-flower manufacture are a very extensive branch of Austrian glass industry. It is now so developed that a petroleum flame gives some 1550 yards of glass thread every minute, that is woven not only for glass cloth, etc., but also for watch-chains, bracelets, etc.

ENGINEERING NOTES.

Marine Engineering—Four-Masted Schooners.

A point has been reached in the building of four-masted schooners for the carrying trade on the Atlantic Coast, where it seems likely that owners may yet have to take measures to insure them themselves. A very large amount of New England and New York capital has within three years been directed to the building of this class of vessels, because it was believed that the ideal freighter had at last been found—the vessel with the carrying capacity of a ship without the expense of maintenance of a square rigger. The new vessels are fast with a ocean wind and have been very profitable.

But their frequent loss is beginning to shock the capitalist who has been investing in these craft, and in ports farther to the eastward than New London the great number of losses on large four-masted schooners which have recently occurred have unsettled the underwriters, and some of the insurance companies, it is reported, will not write them hereafter. Others have increased their rate from one to two per cent.

The principal trouble with the four-masters is found to be in their rig. Their lower masts are so lofty and are ranged so closely together that the standing rigging does not have a fair chance to support them. The shrouds or stays are so much larger than those on square-rigged craft, and form such a sharp angle with the range of the masts, that the spars have almost no support in a heavy seaway. In a square rigger the vessel is found to be of equal beam, while the masts are much shorter—consequently the spars are supported firmly.

In nearly all of the cases where it has been necessary to abandon four-masters at sea, it is found that the masts of the vessels have been carried away, thus rendering them unmanageable in a seaway. It is also considered that the centerboard is another objectionable feature of the four-master, as it is alleged that it weakens the ship's keel. The centerboard works up and down through a long slot in the keel, and the larger the vessel the larger the slot. Many builders now believe that a keel should be substituted for the board in vessels of over 400 tons. It is also said that the light draught of these craft is a bad fault. They are built so as to run in the shallowest water to discharge, and this fault of course injures them for deep-sea sailing. Again, it is said that underwriters do not think the large schooners carry sufficient crews and that they depend too much upon the engine to make or shorten sail, and, in case the engine becomes disabled, the men are liable, because of lack of numbers, to be placed in a position where they would be powerless to avert disaster.

The tendency of the schooner-builders seems now to be to fall back to the construction of the three-masters of 500 or 600 tons burden. It is found that these are the safest and best vessels for investors in the long run.

ELECTRICAL MOTORS UNDERGROUND.—Is the grip to be done away with in its use on cable railways? It is an open secret, says the *St. Louis Globe-Democrat* that several professional inventors are trying to perfect a new street-car motor to combine the advantages of cable and overhead electricity, and to do away with the objections of both systems. The idea is to construct a conduit somewhat similar to that used for cables, but large enough to allow a small electric motor to run on very narrow-gauge tracks laid underground. Each motor will be connected with a train of cars by means of a rigid coupling which will run in a slot just as the grip of a cable car does. To make the invention a success, the engineer must be able to ride on the surface car, and yet have perfect control over the motor running underground. The difficulties are by no means appalling in the light of recent triumphs over apparent impossibilities, but the motor will have to be very small, or the conduit would be too large to be practicable. This is a revival of the scheme of the first patentee of the conduit street-motor system. His idea was to run a steam locomotive in a tunnel and have a rigid connection with the cars above. The impossibility of constructing tunnels under the streets large enough to admit locomotives killed the scheme before it was well announced, but it is believed that electricity will remove all the difficulties.

CHINESE ENGINEERS.—As a literary curiosity, the Chinese translation of eight chapters of Mr. Matheson's "Aid Book to Engineering Enterprises," which has recently been published, will probably be unrivaled for some time to come. It is the first technical work in the Chinese language on railway and harbor construction. The Chinese title of the work would read in English as follows: "Essay on Construction, Englishman Matheson gives the idea. Englishman Feyer and Chang Tien translated it." The work is printed on fine, thin rice paper, from large type, and the book is inclosed in loose boards of polished rosewood, held together by silk ribbons, each chapter being separately stitched into a silk cover. The original engravings have been faithfully, though quaintly, reproduced on a larger scale.

The latest novel use for refrigerator cars is the shipment of pianos. It is proposed to use

such cars not only for perishable freight, as heretofore, but for all goods which are affected by changes of temperature.

ELECTRICITY.

The Path for the Future.

The present status of electricity, while full of difficulty and worry, is also full of hope, remarks *Electric Power*. By the cutting off of the supply of currents in New York for the arc and incandescent lights it has been revealed to the people, in a manner that no other course could have done, how absolutely essential to their comfort and well-being the newly utilized force has become. The temporary losses and annoyances to the electrical companies, though very great, will therefore prove in the end to be of lasting benefit, and when the service is resumed the demand for electric light will be greater than ever before, and the now existing disagreeable and annoying circumstances, due mainly to the injection of politics into business affairs, will be remembered as a lesson.

But the electric light, though at present the most extensive, is destined to be only a branch, and a small branch at that, of the application of electricity to the service of man. It is no wild dream of the imagination to look forward to the time when all the light, power and heat necessary for man's comfort and happiness will be supplied by this inexhaustible natural force, cheaply, safely and conveniently. When Bulwer wrote his novel, "The Coming Race," it was thought that his description of the force "Viril," which he put into the hands of his characters, was overdrawn and impossible. But the chief powers of "Viril" are already found to be possessed by electricity, and the few remaining properties which Bulwer assigned to "Viril" are not beyond the bounds of future discovery and invention. To the "coming race" of Bulwer the telephone and phonograph would have been as wonderful as their "Viril" appeared to us at the time the book was written.

THE MYSTERIOUS POWER.—A recent writer on modern electrical theories shows that a few striking phenomena, taken together and reduced to one primal cause, point quite conclusively to the necessary existence of some medium by which electrical action, whatever its nature may be, is transmitted, this medium being placed in a state, potentially, which it did not possess before the electrical influences were applied to it. Prof. Rowland points out very forcibly that not only are the actions to be considered which go on within the conductor, transmitting the so-called manifestation of force—electricity—but that that peculiar state is equally existent beyond the limits of the conductor in space; and, indeed, that electrical disturbances are transmitted into space far beyond what is generally supposed to be the fact, due entirely to the transmitting medium, the ether. Though the electric current is an unsolved mystery, a very great advance in understanding it is involved in the knowledge that to the outside disturbances in the medium must observation be directed in search of more light.

THE TRUTH ABOUT DANGERS OF ELECTRICITY.—The committee appointed by the Senate of the New York Legislature to investigate the dangers of electricity held its sessions in New York City, took testimony and reported. The following paragraph from that report contains the result in a few words, but very suggestive ones: "It appears that 16 persons have been killed in the city of New York during the past three years from electrical currents, most of them being employees of electric companies. Most if not all of these deaths were caused by a continuous current used for arc lighting. As far as the committee could ascertain, no accident has been caused by underground conductors. The causes for most of the deaths appear to have been carelessness on the part of the electric companies in using poorly insulated or badly arranged conductors, and in neglecting other precautions required for safety. It appears doubtful if an overhead system of wires carrying high-tension currents could be, under any circumstances, maintained in the crowded streets of the city of New York without more or less danger to the public."

HEATING CAPACITY OF ELECTRICITY.—E. C. Hughes, one of the electricians of the Pillsbury Mill, has lately been experimenting with the heating capacity of electricity, and has demonstrated that almost any degree can be produced with comparative ease. He had gotten up an oven for baking and heating gluten, which is a great success. The gluten is placed in a cylindrical glass case, about an inch in diameter, which in turn is placed in the oven, the latter also being in cylindrical form.

ELECTRICAL LAUNCHES ON THE THAMES.—This season there will be 24 electrically propelled launches upon the Thames. Electricity, altogether, is in favor on the river, as many house-boats are being fitted with the electric light.—*London Invention*.

AN ELECTRIC CANDLE is one of the newest productions of the Edison-Swan Co. It is fitted upon a candlestick or candelabra, and is twisted into a flamboyant spiral, to give the illusion of a flame.



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Saturday, May 24, 1890.

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Business Announcements.

[NEW THIS ISSUE.]

Ore Concentrator—H. P. Holland.
Assessing Notice—Acme Mill and Mining Company.
See Advertising Columns.

Passing Events.

The lower House of Congress has finally passed the McKinley tariff bill after a long discussion. Nothing definite has yet been done about the silver question, which is still under consideration in the Senate.

The mining people of Fresno county are felicitating themselves on having found the mother lode of California in their mountains. It is to be hoped that the assertion will prove true, but "mother lodes," like "lost mines" and "second Comstocks," are in these days looked upon incredulously, there having been so many reports which proved to be without basis.

The molders' strike still continues. More men arrived from the East this week for the shops, and, as usual, a small proportion were "captured" by the strikers. Still the shops are all running, as they have been for the past few weeks.

The movement has commenced toward properly representing the interests of California at the coming World's Fair at Chicago. All persons interested in mining should do their share toward seeing the mining industry as well represented as that of agriculture.

Always Take a Receipt.

Subscribers to this paper are earnestly requested to take a receipt for every payment made on subscription, no matter how small the amount or to whom paid. We use printed receipts, with stubs attached, to prevent mistakes, through carelessness (or other reason), by agents or others. For our mutual interests take a receipt, whether you preserve it or not.

To Illustrate Our Mining Industry.

It is to be hoped that an active interest will be taken by the miners and mine-owners of this State toward properly representing the mining interests of California at the World's Fair in Chicago. It is evident that the State intends this time to make a good showing, as already the subject is being agitated in many communities, and the Governor has started a general interest by calling attention to the matter. The agricultural and horticultural interests are sure to be well represented owing to the numerous societies and associations connected with such matters and the fact that those having lands to dispose of will give aid and assistance to anything which will advertise these industries and induce immigration.

Among the miners, however, there are no clubs, associations, or societies. Those men who are very prominent in the industry and have gained wealth in mining, have little or no personal interests to serve by an exhibition, and are apt to be apathetic. As far as selling mines is concerned, very little has been accomplished by exhibitions held in the past. It takes personal representation and examination to do much in that direction. It is no easy matter, therefore, to arouse an interest in a mineral exhibit. Circulars and letters to miners do little good. If accredited representatives should be sent in person to the various mining centers, good collections of ores could be made, but not unless this is done.

It is to be hoped, however, that if money is to be spent for a mining industry exhibit, it will not all be spent in collecting ores. A fine representative collection of minerals could be forwarded from the State Museum of the Mining Bureau. These specimens are already collected, identified and labeled, and could be arranged for display with much less trouble than trying to make a new collection.

Moreover, a mere display of minerals conveys little idea of the mining industry to ordinary people. They do not understand their significance, and to a large majority a fine specimen of iron pyrites would serve as gold ore.

What is wanted is some sort of graphic representation of our mineral resources—separate maps or casts, for instance, showing location in the various counties where certain minerals are found. Plaster casts of the whole State could be made in number, each one showing the locations of a separate mineral substance. California is known for gold, but it produces many other substances. For instance, within our borders are found gold, silver, borax, chrome, coal, copper, granites, gypsum, infusorial earths, iron, kaolin, lead, marble, ocher, petroleum, salt, sandstone, slate, cement, natural gas, plumbago, asphaltum, bituminous rock, aluminium, asbestos, tin, clay, nickel, lime, quicksilver, mineral paints, sulphur, lithographic stone, mica, platinum, magnesia, and other mineral products.

Under or near each of these plaster casts could be placed samples and specimens of the crude material and the finished products, illustrating the uses to which they are put.

In the case of the more prominent substances, the machinery and processes used should be shown. As for gold mining, the common miner's pan, cradle and sluice, the hydraulic giant, elevators, etc., could be exhibited, illustrating the appliances connected with the placer and deep gravel mining. Then the old-style arrastra driven by a mule could be shown side by side with a modern stamp-mill driven by water-power. All these could be shown at work on gravel and ore, of which there should be enough to show the working of the whole process. Of course we could not wash down a gravel bank with a giant, but large drawings, paintings and photographs would serve to convey the idea.

All this will cost money, of course, but it will serve a purpose which a mere labeled collection of ores in glass cases will not do. Every mine in the State could be represented. Models of the work of large plants could be made.

This should all be attended to by competent persons. In this connection the following letter is of interest:

Honorable George C. Perkins, President of the Chamber of Commerce—DEAR SIR: By virtue of the office with which I have been honored, it gives me pleasure to announce to your honorable board that it is within my duties to

look after and examine into the mineral resources for the benefit of our State. I have for some time personally, and through my field assistants, been canvassing in the mining counties in reference to having a proper mineral display at the World's Fair, and it is my opinion that the different products should be separately exhibited with due credence to the counties, and not blended as quartz, grain, etc., by each county. Where our products are so widely at variance, we should give each industry a separate and decisive display. I therefore offer to your honorable board my services in behalf of the State to work up our mineral display, and believe I can safely promise both stamp and rotary mills, and appliances for working ore and recovering gold, from the primitive rocker to the improved hydraulic elevator. Very truly yours,

WILLIAM IRELAN, JR.,
State Mineralogist.

With a suitable appropriation, the State Mineralogist could arrange a very creditable display. But it is to be hoped that the subject will not be dismissed by sending a simple collection of minerals alone. More is needed than that to attract attention to the mining industries of California.

The Silver Bill Under Debate.

Senator Jones' silver bill is still under debate in the U. S. Senate. The speeches delivered by Senators Jones, Teller and Stewart during the debate are master efforts and win for them unqualified praise. Their presentation of bi-metallicism should disarm opposition and bring to its support the clear thinkers who are not controlled through money or other considerations. The discussion in Congress and the so far favorable effect of the advance in the price of silver carry out quite fully the MINING AND SCIENTIFIC PRESS' heretofore expressed views of the natural result of remonetizing the metal. The effect is far-reaching, probably more so than even its most sanguine friends contend will follow. There is no leading industry but will either directly or indirectly be benefited by silver being remonetized.

To show how the question is viewed abroad, we take the following from the London Money, May 3d, in an editorial under the caption "The Silver Rift in the Clouds":

The rise in silver has naturally led to a rise in all silver securities, and, not unreasonably, it has also advanced very sharply the price of American railroad securities. Indeed, during the past ten days there has been more business in the American market than has been seen for over a year in the same time. This is not surprising, for it is clear that if the legislation takes place, prices of all kinds must rise. At present the American revenue so largely exceeds the expenditure that immense sums are locked up in the Treasury. Every now and then a portion of the money is expended in the purchase of bonds. But this leads to the calling in of bank notes, or, what is the same thing, the deposit of an equivalent amount of coin or greenbacks, and thus there is constant complaint that the action of the Treasury is restricting the circulation and disturbing the money market. If the purchases of silver are doubled, or somewhat more, there must be a very large increase in the currency, for the present coinage of silver and gold suffices to counterbalance the action of the Treasury, and the increased silver issues will therefore go to augment the currency. But with an augmented currency at the rate that is now proposed all prices must rise. Even if there is some delay in the passing of the measure, it will become law before the autumn, when there is always a great outflow of coin and notes from New York to the interior. A largely-increased issue of silver notes will supply the South and the West without drawing as inconveniently as in past years upon New York.

There ought, therefore, to be much less stringency in the New York money market next autumn than there usually is, and yet the South and the West will be fully supplied. Consequently speculators seem justified in their argument that the result of the proposed legislation will be to assure so comparatively easy a money market next autumn as to allow of an immense business upon the Stock Exchange, as well as throughout the country, and therefore to make certain a sustained rise in all prices. An inflation of the currency must raise wages and the price of commodities, as well as securities.

A BIG CONTRACT FOR THE RISON.—The Rison Iron Works have been awarded the contract for all the winding machinery for the new plant of the California-Street Railway Company. The work will all be done in this city.

THE two last carloads of ore shipped from Ponjade's Spring mine sold in Salt Lake for \$66 per ton and \$190 per ton respectively. Pioche appears to have a paying mine that is not much talked about.

The Pioneers Passing Away.

(Concluded from page 345.)

many years, Mr. Bull was possessed of considerable other property in this city. He was also interested in a large number of corporations, and owned a majority of the stock of the Gold and Stock Telegraph Company. He was also the owner of a one-third interest in the California Market.

He was considered a remarkably shrewd man, careful and polite in business matters, and of a retiring disposition.

William P. Foller, who died on Saturday at the age of 63, came to California in 1849, around the Horn, and on reaching this coast immediately went to work in the mines. He did not remain at that vocation long, but in a few years returned to Sacramento and opened a paint and oil store with John Rivet, the firm name being Rivet & Co. The business was continued under that firm name until 1857, when Mr. Rivet was succeeded by Mr. Hather. He afterward entered into business with Mr. Whittier, and established what is now the third largest house of the kind in the United States. The firm deals in paints, oils, glass, etc., and manufactures white lead and mineral paints. Mr. Foller was a man of gentle manner, and had a reputation for strict integrity. As a business man Mr. Foller was prominently known, and by his business ability acquired a large fortune. The deceased was a member of Golden Gate Lodge of Masons, and was also identified with the San Francisco Board of Trade and Chamber of Commerce.

John H. Redington, who died on Saturday, was one of the best-known merchants on the Pacific Coast, having been connected with the drug firm of Redington & Co. He came to California in 1849, and had been engaged in the drug business in this city for nearly 40 years. His was the pioneer wholesale drug business of California.

Mr. Redington was born at Waterville, Kennebec county, Maine, in 1825. He was raised and educated in this little village. The deceased was classed as one of the argonauts who did much to lay the foundation for the great State, and he continued in the drug business until 1875. During that year his health failed him and he sought the climate of Santa Barbara. Mr. Redington, whose name still clings to the firm in this city, leaves a widow and seven children; the eldest is a son 24 years of age. Deceased leaves a fortune estimated to be about \$1,000,000.

Yellowstone Park.

The Yellowstone National Park is in the extreme northwestern portion of Wyoming Territory. Its area is between 4000 and 5000 square miles. The Park plateau, with the adjacent mountains, presents a sharply-defined region, in strong contrast with the rest of the northern Rocky Mountains. It stands out boldly by itself, unique in topographical structure and complete as a geological problem. The central portion of the Yellowstone Park is essentially a broad, elevated, volcanic plateau, between 7000 and 8500 feet above sea-level, and with an average elevation of about 8000 feet. Surrounding it on the south, east, north and northwest, are mountain ranges with culminating peaks and ridges rising from 2000 to 4000 feet above the general level of the enclosed table-land. South of the Park the Tetons stand out prominently, the grandest peaks on the northern Rocky Mountains. To the eastward lies the well-known Wind-river range. Along the entire eastern side of the Park stretches the Absaroka range. At the northeast corner a confused mass of mountains connects this range with the snowy range. The Gallatin range incloses the Park on the north and northwest.

The scenery throughout the region is inspiring and wonderful. The canyons, falls, lakes, geysers and rivers must be seen to be appreciated. A brief description within the province of a newspaper article would fail to do the subject justice. The map given on the first page was made by Arnold Hague of the U. S. Geological Survey, who has contributed a paper on the geology of the district to the Am. Inst. M. E. The map will give an idea of the general geographical features of the section.

ALL the miners at the Roslyn coal mines, Wash., have signed contracts for another year.

The Deep Gold Placers of California.

(Concluded from page 347.)

The following notes on the Muir glacier of Alaska are selected from the very interesting work of Prof. Wright of Oberlin, Ohio, "The Ice Age in North America":

"This now celebrated glacier lies in latitude 58 50 north and longitude 136 40 west of Greenwich. Twenty-five or thirty small islands, the Beardslee islands, near the mouth of Glacier bay, composed of loose material (glacial detritus), show a striking contrast with other coast islands.

"The width of the ice where the glacier breaks through between the mountains is 10,664 feet. The main body of the glacier occupies a vast amphitheater, with diameters varying from 30 to 40 miles. The depth of water 300 yards south of the ice front is 516 feet, and the altitude of the ice front itself, 250 feet. A short distance back, the general height is 403 feet. Seven miles from the front, on the ice, the altitude is found to be 1050 feet above the bay."

There are many reasons to believe that great bodies of glacial ice once existed in the mountains of California, in inland basins and along the seacoast.

The glacial area of Switzerland is 900 square

the mountain valleys. In high altitudes they reach the sea; in Switzerland some extend for 30 miles more or less and have a width of a mile or more, and are often as much as 800 feet in thickness. The second order seldom extend below the deep canyons in which they are formed. Those of the third order are called recremented glaciers; they are built up of frag-

and the flow are in equilibrium. During an unusually favorable season they advance and push the moraines of former years bodily forward with resistless power. In a warm season a glacier recedes. When a season is wet, and an unusual fall of snow occurs during the winter, it is elongated.

The motion of the glaciers, like that of a

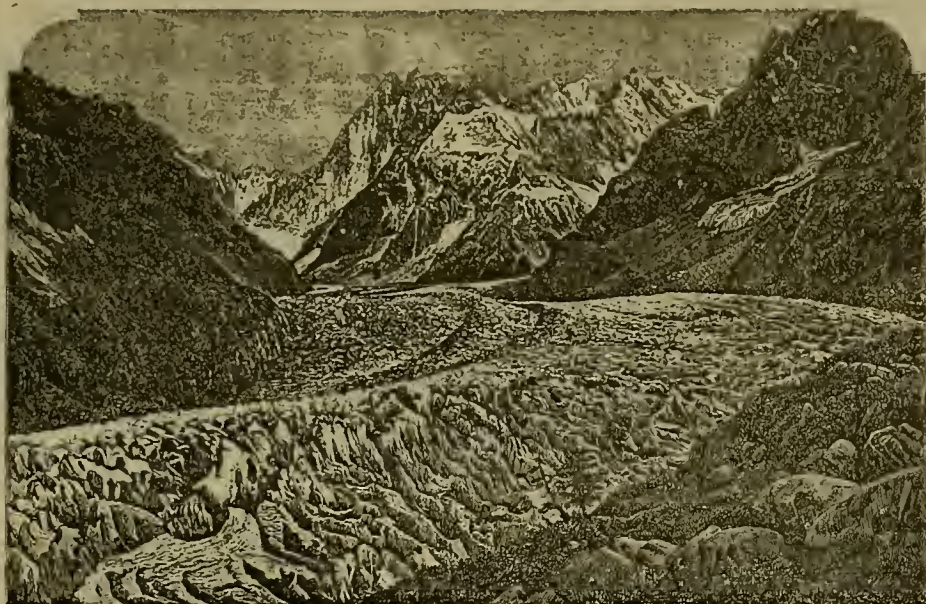


FIG. 10.—MER DE GLACE.



FIG. 11.—GLACIER OF ALETSCHE.

miles. The Aletsch glacier is the largest, being fifteen miles long. The grandest glacial mass is that of the Bernina chain; the glacier covers 330 square miles.

Biederker thus wrote: "The Rhone glacier is nine miles long and rises terrace-like, resembling a gigantic waterfall suddenly arrested in its career by the icy hand of some Alpine enchanter."

The present glaciers of the Alps are believed to be the shrunken remains of far greater ancient glaciation.

According to Prof. Wright, "The indications that the Muir glacier is receding and that its volume is diminishing, are indisputable and numerous. It is not incredible that glaciers filled the whole bay 100 years ago."

The decay and retirement of the great California glaciers must have been extremely gradual, and during the last stages, their power being feeble, instead of pushing the rocks before them in gigantic ridges as they did in their prime, they left the boulders in the old channels. After their recession, the great depressions were filled with water and the deposit of pebbles began and continued until the overflowing dyke of eruptive mud covered them as we now find them.

General Description.

A glacier is a river of ice. According to Geike, there are three varieties, the first order extending from the snow of the summits to

mounts which would be icebergs under other conditions, but now fall from ice cliffs and become by regelation a solid mass, in turn governed by the same laws, which move slowly downward like the glaciers of the second class. Such a glacier observed by Geike in Arctic Norway was fed by a succession of avalanches from those above.

Glaciers move downward until liquefaction

river, is unequal, being greater in the center and near the surface than along the sides and bottom. The rapidity of the flow depends on the declivity. The daily flow of the Mer de Glace in summer is 20 to 27 feet in the center and 13 to 20 feet at the sides. The glacier at Jacobshagen on the west coast of Greenland flows 48 to 69 feet daily in August.

But the liquefaction below is constantly sup-

plied by the falling snow above, and the grinding and crushing of rocks goes on for centuries without cessation. Glaciers drain the snow accumulations above the snow-line as rivers do the watersheds below.

Moraines are accumulations of earthy debris caused by a glacier. A terminal moraine is a ridge extending across a valley in which a glacier lies. It is mostly composed of blocks and rock fragments which have been borne down on the ice and dropped over the ice cliff which marks the termination of the glacier.

It is also partly earth and till, pushed forward by the moving ice. These moraines are sometimes so large that they are regarded as considerable hills or even low mountains. Those of extinct glaciers mark their former position. They are studied with great interest by geologists. A lateral moraine is a similar gathering somewhat elevated by pressure, on which is piled crushed rocks as in the case of the terminals. These accumulations rise high above the ice surface.

Conditions Under Which Glaciers May Exist.

The following conditions must exist before a deposit of snow can become a true glacier: It must lie on an inclined surface at a considerable altitude, in a climate sufficiently humid to insure heavy falls of snow at intervals, followed by periods of warmth during which a portion of the ice is reduced to water.

Heat is as essential to this condition as cold; a sheet of ice or snow without accretion, on a perfectly level surface, at a constant temperature of zero, could do no work; but in a mountain canyon of sufficient dimensions, when the snow accumulations are great, it is one of the most powerful agencies known to the geologist.

As the lower portion is melted and passes away, the icy stream flows down, slowly to be sure, but with resistless force, grinding the hardest rocks to mud, scooping out deep channels, often forming basins which become lake-beds when the glaciers retire, which they generally do in time and with a change of climate.

Were it not for the constant fall of snow at the head of the glacier, and the extreme slowness with which the ice river flows, this action would be brief.

There are two kinds of ice—snow ice and water ice. One is compressed and partly melted snow, the other frozen bodies of water. Recent snow on mountain-slopes above the snow line gradually assumes granular structure which merges at last into "névé." This is a name given in Switzerland to semi-ice in a state between newly fallen snow and glacial ice; it is gradually consolidated and filled with air globules, sand and mud. When in large masses it is blue in color, and sometimes shows a veined structure, alternating in bands of white ice full of air bubbles and transparent blue ice.

Beneath the surface of the Glacier des Bossons in the Valley of Chamouni, which I visited in 1872, a tunnel had been driven. The effect within was that of daylight illumination through windows of light blue glass. This color is probably due to the decomposition of light or to polarized light, and not to any actual color of the ice itself.

Névé continues to the snow line and becomes glacier ice below, which is often transparent.

Newly fallen snow is white, not from any inherent color it possesses, but from refraction of light from the numerous air bubbles entangled in the snow crystals at their birth, for the same reason that milk is white, although the fat globules are transparent.

During the midday heat of summer the snow, partly melting, yields up the air bubbles and by its weight becomes semi-ice, a change which takes place in the hands of the schoolboy when he quickly fashions the hard snowball, which he could not do with all his skill on a cold day with newly fallen snow.

In Greenland, different conditions exist. The great ice sheet does not wholly follow inclined planes, but sometimes flows up the sides of ridges; snow accumulates inland, the weight of which causes it to flow in every direction from the center toward the only point of less resistance, the seashore. The warm seacoast causes the ice to become softer and to offer less resistance to the pressure from the center.

There are no moraines on the inland ice of Greenland except where a few high points project above the ice sheet which extends for an unknown distance inland and lies on a plain sloping to the ocean. As it flows into the sea, it breaks off at intervals at the crevasses and forms icebergs in cliffs from 1000 to 2000 feet high, which float away and meet in semi-tropical seas.

Fig. 12 represents the Greenland inland ice. It is reproduced from "Science for All," Volume 5.

The snow line is a well-defined horizon above which snow does not wholly melt during the summer. The snow line in the Alps lies at an elevation of 8500 feet above sea level. In the Andes it is 18,000 feet, and on the northern slopes of the Himalaya 19,000 feet. It varies somewhat with change of season, latitude and elevation.

There is likely to be trouble from strikes at the Duquoin collieries. There is to be a meeting between the miners and colliery owners next Monday.

NINETEEN men were killed last week by an explosion in the Ashley coal mines at Wilkes-Barre, Pa.

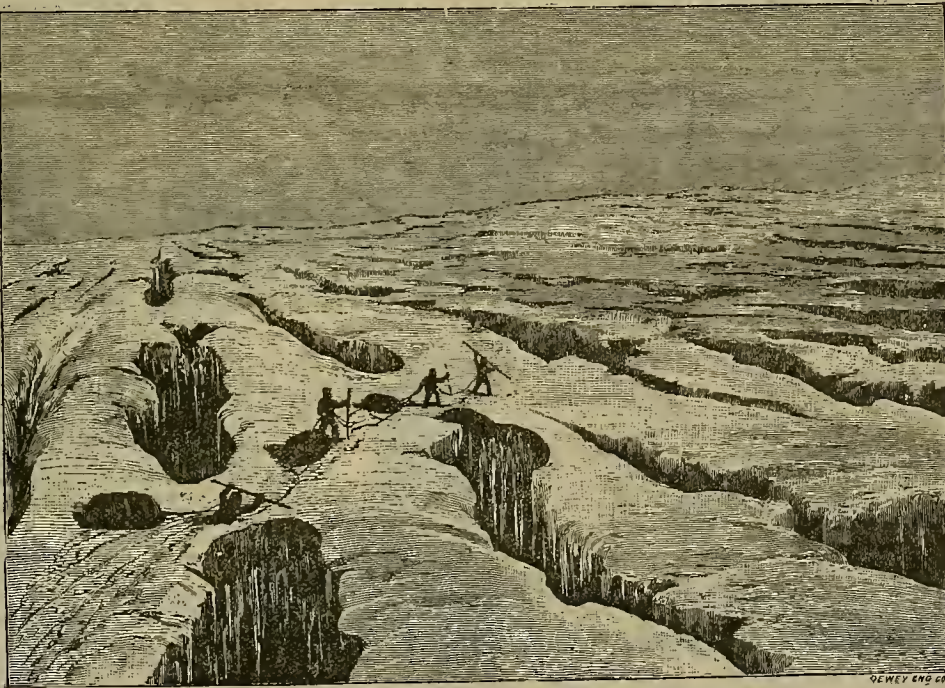


FIG. 12.—GREENLAND INLAND ICE.

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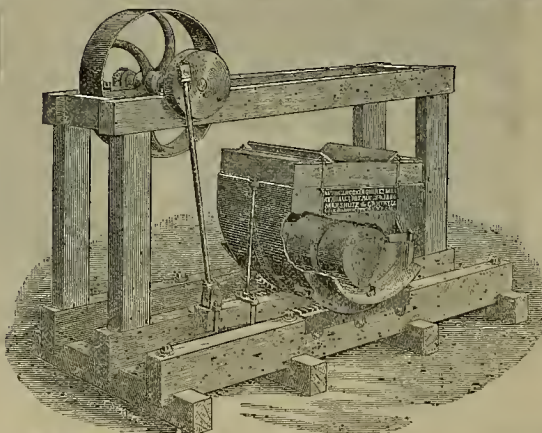
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Safety Cages,
Safety Hooks,

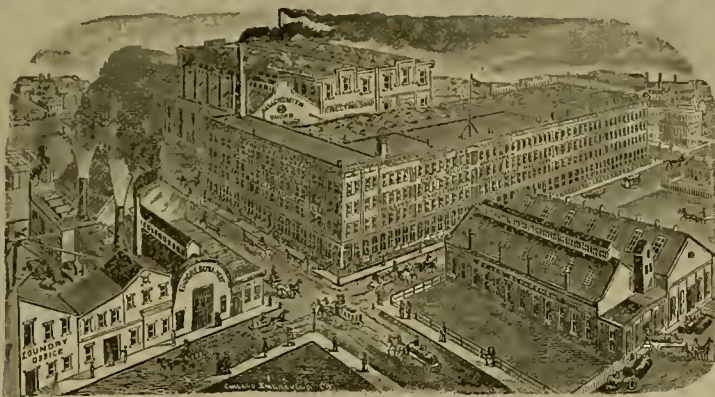
DRE CARS, WATER & DRE
BUCKETS,

Air Compressors,
Rock Drills, Etc.

GENERAL MILL AND
MINING SUPPLIES, ETC.

Sectional Machinery
FOR

MULE-BACK
TRANSPORTATION.



Pumping Engines
and Cornish
Pumping Machinery,

IMPROVED
WATER JACKET

Blast Furnaces for
Galena & Copper Ores,

SLAC CARS AND POTS,

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Pressure Blowers,

SUSPENDED
TRAMWAYS.

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BRANCH OFFICES: NEW YORK, Room 43, No. 2 Wall St. DENVER, COLO., 1316 Eighteenth St. SALT LAKE CITY, UTAH, 7 W. Second South St. LONDON, ENG., 23 Bucklersbury, E. C. CHIHUAHUA CITY, MEXICO, No. 11 Calle de Juarez. LIMA, PERU, South America. JOHANNESBURG, TRANSVAAL, South Africa.

HELENA, MONTANA, Room 28, Merchants' National Bank Building, No. North Main St.

SOLE WESTERN AGENTS FOR TYLER WIRE WORKS DOUBLE CRIMPED MINING CLOTHS.

THE PELTON WATER WHEEL

GIVES THE HIGHEST EFFICIENCY OF ANY WHEEL IN THE WORLD.

OVER 800 ALREADY IN USE.

Affords the Most Simple and Reliable Power for all Mining and Manufacturing Machinery. Adapted to heads running from 20 up to 2,000 feet. From 12 to 20 per cent better results guaranteed than can be produced from any other Wheel in the Country.

ELECTRIC TRANSMISSION.

Power from these Wheels can be transmitted long distances with small loss, and is now extensively used in all parts of the country for generating both power and light.

APPLICATIONS

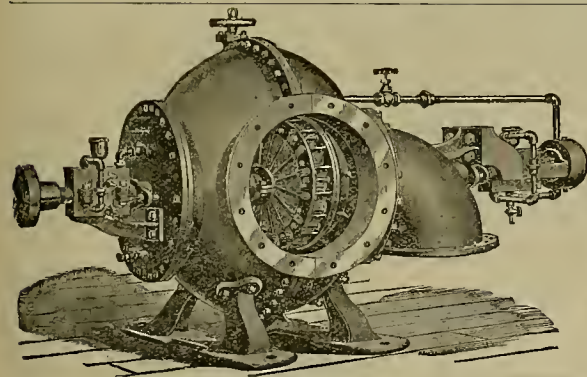
Should state amount, and head of water, power required, and for what purpose; with approximate length of pipe; also, whether the application is with reference to *Wheels* or *Motors* described below. SEND FOR CIRCULARS.

The Pelton Water Wheel Co.

121 MAIN ST., SAN FRANCISCO, CAL.

PELTON WATER MOTORS.

Varying from the fraction of 1 up to 15 and 20-horse power. Unequaled for all light-running machinery. Warranted to develop a given amount of power with one-half the water required by any other. SEND FOR MOTOR CIRCULAR. ADDRESS AS ABOVE.



JAMES LEFFEL'S Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

JAMES LEFFEL & CO.,

Springfield, Ohio, or 110 Liberty St., New York.

FRASER & CHALMERS, General Agents,
Chicago, Ill., and Denver, Col.

PARKE & LAOY, General Agents, San Francisco, Cal.

The Best Mining District
On the Pacific Coast!
GRASS VALLEY, CAL.

THE BEST NEWSPAPER published in the district is
THE TIDINGS.

Daily and Weekly edition. Gives all the Mining News. Dealers in Mining Machinery and Mining Supplies will find THE TIDINGS the best medium for directly reaching the owners or managers of mines. Investors in mines will find it to their advantage to subscribe.

Many mines are in successful operation, and new enterprises are being instituted and many others are in contemplation.

DAILY, \$6 00 a year; WEEKLY, \$2 50, in advance.
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T. C. HOCKING, Editor.

INVENTORS on the Pacific Coast should secure their Patents through Dewey & Co.'s MINING AND SCIENTIFIC PRESS Patent Agency, No. 220 Market St., S. F.

THOMAS PRICE & SON,

Assay Office, Chemical Laboratory,

BULLION ROOMS and ORE FLOORS,

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COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

Metallurgy and Ores.

**SELBY
SMELTING and LEAD CO.,**
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**GOLD AND SILVER REFINERY
And Assay Office.**

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

— MANUFACTURERS OF —
**BLUESTONE,
LEAD PIPE,
SHEET LEAD,
SHOT, Etc., Etc.**

ALSO MANUFACTURERS OF
Standard Shot-Gun Cartridges,
Under Chamberlin Patent.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

**ASSAYERS' MATERIALS, MINE
AND MILL SUPPLIES,**

ALSO CHEMICALS, AND PHYSICAL, SCHOOL AND
CHEMICAL APPARATUS.

63 & 65 First St., cor. Mission, San Francisco.

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scoffers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price.

Agents for the Morgan Crucible Co., Battersea, England. Also for E. G. Dennison's Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices. Our Illustrated Catalogue and Assay Tables sent free on application.

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Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,
Near First and Market Streets, S. F.

O. A. LUKEHARDT, Manager. ESTABLISHED 1889.

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of Mines; Plans and Reports furnished.

O. A. LUKEHARDT & CO.,

(Formerly Bunn & Luckhardt,

Mining Engineers and Metallurgists.

GREAT REDUCTION!

BATTERY SCREENS.

Best and Cheapest in America.

No imitation, no deception, no plished or rotten iron used. Only genuine Russia iron in Quartz Screens. Plashed iron screens at nearly half my former rates. I have a large supply of Battery Screens on hand suitable for the Huntington and all Stamp Mills, which I will sell at 20 per cent discount.



PERFORATED SHEET METAL

For Flour and Rice Mills, Grain Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Iron, Steel, Copper, Brass, Zinc and other metals punched for all uses.

Inventor and Manufacturer of the celebrated Slot Cut or hurred and Slot Punched Screens.

Mining Screens a specialty, from No. 1 to 15 (fine).

Orders promptly attended to.

San Francisco Pioneer Screen Works,

221 & 223 First St., San Francisco, Cal.

JOHN W. QUICK, Proprietor.

WINCHESTER HOUSE,

44 Third Street, San Francisco, Cal.

This Fire proof Brick Building is centrally located, in the healthiest part of the city, only a half block from the Grand and Palace Hotels, and close to all Steamboat and Railroad Offices.

Laundry Free for the use of Families.

HOT AND COLD BATHS FREE.

Terms, Board and Room, \$1.00 per Day

And Upward.

Rooms with or without Board.

Free Coach to the House.

J. POOLEY.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING MAY 13, 1890.

- 427,653.—WATCH—H. Albert, Lauenstein, Germany.
- 427,660.—THRASHING MACHINE—Jas. E. Beach, Roulier, Cal.
- 427,672.—MONKEY-WRENCH—H. B. Cary, Los Angeles, Cal.
- 427,835.—WAFFLE-IRON HANDLE—E. H. Chesterton, Los Angeles, Cal.
- 427,970.—TURNABLE—Clement, Watriss & Heynemann, S. F.
- 427,750.—SEWING MACHINE—T. J. Daniels, S. F.
- 427,758.—CAR-COUPLING—S. J. Ford, Placerville, Cal.
- 427,853.—YARN-WINDER, ETC.—H. Gimmini, S. F.
- 427,687.—FRUIT-GRADER—Wm. C. Hamilton, San Jose, Cal.
- 427,688.—TYPE-WRITING MACHINE ATTACHMENT—H. O. Hooper, S. F.
- 427,692.—CRUSHING MILL—F. A. Huntington, S. F.
- 427,588.—STUMP-EXTRACTOR—J. Minson, Bloomfield, Cal.
- 427,701.—METALLURGICAL APPARATUS—W. H. Masser, Los Angeles, Cal.
- 428,015.—INCORUSTATION PREVENTIVE—J. W. Mitchell, S. F.
- 427,707.—MIXER FOR EXPLOSIVES—W. R. Quinan, Pinole, Cal.
- 427,908.—CAR-COUPLING—Rigby & Reed, Seattle, Wash.
- 427,795.—STREET-SWEEPING MACHINE—M. C. Robichan, S. F.
- 427,928.—NON CONDUCTING COVERING—J. L. Stillman, Fresno, Cal.
- 428,025.—FLY-FINGER FOR PRINTING MACHINES—H. Swain, S. F.

The following brief list by telegraph, for May 20, will appear more complete on receipt of mail advices:

California—Truman C. Naramore, Los Angeles, wave motor; Casey Newhouse, Modesto, and L. Hansen, Newman, sofa belt; Andrew J. Oliver and E. Wren, Oakland, wagon-jack; John C. Ludwig, assignor of half interest to A. C. Paulsell and M. Corcoran, S. F., T. C. Coogan and H. T. Compton, Oakland, telephone; Edward and P. Maloney, S. F., borshoes; Joseph B. Jardine, S. F., apparatus for reducing bituminous rock, etc.; Charles H. Fox and M. Hegele, Delano, bottle-stopper; John H. Hanson, Oakland, barrow; Carl Buchmiller, Pasadena, grass receptacle for lawn mowers; Herbert W. Adams and P. N. Tyron, S. F., veil-fastener.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

THRASHING MACHINE.—James E. Beach, Rontier, Sacramento Co. No. 427,660. Dated May 13, 1890. The operation of this attachment is as follows: The chaff and such grain as still clings to it are blown off of the shoe and over its receiving auger and on to the lower end of a carrier belt. By this it is carried upwardly, the grain disengaging itself and passing through the perforations of the belt, being assisted by the shaking movement to which the belt is subjected, and said grain falling upon the directing board beneath the carrier, runs down and into the second conveyor, from which it is directed into the elevator to go through the machine again as usual. The straw and chaff are carried up over the end of the carrier and discharged in substantially the same pile as the straw from the main straw-carrier above.

TYPE WRITING MACHINE ATTACHMENT.—Henry O Hooper, S. F. No. 427,688. Dated May 13, 1890. This attachment for a type-writing machine is for the purpose of enabling the writer or operator to inspect the work as fast as the letters are formed, and without stopping and turning up the carriage for this purpose. It consists of a refracting prism supported beneath the impression roller, and the sheet which passes around it, in such a manner that the refraction of the light through the prism will present the letters in their proper position to the eye of the writer.

WATCH.—Heinrich Albert, Lauenstein, Germany. No. 427,653. Dated May 13, 1890.

This relates to one of that class of watches in which separate dials are provided for indicating the hours, minutes and seconds. It is the intention in this watch to use a spring of a sufficient length to exert its power for a longer time than is usual. To employ such a spring necessitates the use of a larger barrel; but a barrel larger than usual can only be employed by throwing the minute-hand arbor out of the center of the face-plate. This is the reason of the peculiar construction adopted by this inventor, and by moving the center of the minute-hand down, space is provided for a more than usually large main-spring barrel. A spring can therefore be used long enough to provide for a continuous operation of the watch during any desirable length of time—as, for instance, four days or more.

MIXER FOR EXPLOSIVES.—Wm. R. Quinan, Pinole, Contra Costa Co. No. 427,707. Dated May 13, 1890. This invention relates to the art of making gunpowder and dynamite, and it

consists of a steam-jacketed tube through which the composition is passed and a stirrer, conveyor or mixer operating within the tube. The object is to produce cheaply and continuously a composition which is to be used directly as an explosive or as a dope to which a percentage of nitroglycerine or other explosive is to be added to give it the necessary explosiveness. The invention relates only to compositions which contain one or more ingredients that can be melted or softened by a moderate heat, which ingredient serves to cement or aggregate the particle of the composition into grains. The apparatus is designed to melt or soften this ingredient and mix it with the others, so as to form by a continuous process a plastic mass which can be readily grained. In ordinary gunpowder or black blasting-powder the sulphur is such an ingredient. The apparatus can also be used in preparing the dope for certain classes of dynamites or those which contain a small quantity of nitroglycerine. In these sulphur may be used as an ingredient; also resin, paraffine, asphaltum and various other substances. In preparing fire explosives such as gunpowder, the ingredient should be pulverized as finely as possible and mixed in the proper proportions before being passed through the apparatus. The finer the material the more intimate the incorporation effected by the apparatus and the better the power. In making the dope for dynamites or other detonating explosives the ingredients need not be ground fine, but should be mixed in proper proportions.

MACHINE FOR SEWING UP THE MOUTHS OF FILLED BAGS.—Thos. J. Daniels, S. F., assignor to Sperry & Co. No. 427,750. Dated May 13, 1890. This sewing machine is specially devised for the purpose of closing and sewing the mouths of flour or other bags after they have been filled, with the view of closing the bags with a peculiar stitch, so that after having once been opened and the contents removed the bags cannot be filled with inferior goods for the purposes of deception.

FRUIT-GRADER.—Wm. C. Hamilton, San Jose, No. 427,687. Dated May 13, 1890. The object of this invention is to provide a simple and effective grader, and one which is not liable to become clogged. The separated fruit drops into different receptacles below, and is by them discharged through the gates into suitable receptacles.

STREET SWEEPING MACHINE.—Mathurin O. Robichan, San Francisco, Cal. No. 427,795. Dated May 13, 1890. This machine involves the novel principle of throwing the dirt upwardly and backwardly over the top of the brush, into the base of the elevator, and thence carrying it directly back and discharging it into a delivery spout at a rear. It is usual to locate the elevator in front of the brush, which necessitates the forward trend of the elevator and the use of other elevators and carriers to get the dirt back again to the rear or side discharge. But in this machine, the elevator hehind the brush, there need be but one elevator, inclined directly backward. Side brushes and a gutter-brush, and power-transmitting mechanisms to operate all the brushes with the proper speed, are also provided, together with several adjustments of the various parts.

Lumber.

Fine, Fir and Spruce.

	RETAIL.	JOSEPH.
Rough Pine, merchantable, 40 ft.	\$20 00	\$17 00
41 to 50 ft.	21 00	18 00
51 to 60 ft.	23 00	20 00
61 to 70 ft.	27 00	21 00
1x3, fencing.	22 00	19 00
1x4.	21 00	18 00
1x3, 1x4 and 1x6, odd lengths.	19 00	16 00
Second quality.	17 00	15 00
Selected.	24 00	22 00
Clear, except for flooring.	31 00	28 00
Clear for flooring.	34 00	31 00
Clear V. G. No. 1 flooring.	6 00	5 00
Firewood.	14 00	10 00
Dressed Pine, flooring, No. 1, 1x6.	32 00	29 00
No. 1, 1x4.	34 00	30 00
No. 1, 1x4, 1x6, and odd sizes.	37 00	33 00
All sizes, No. 2.	27 00	24 00
Stepping, No. 1.	44 00	35 00
Stepping, No. 2.	34 00	25 00
Ship timber and plank, rough.	27 00	18 00
Selected, planed 1 side, average 40 ft.	29 00	24 00
" " " " " " " " " " " "	31 00	26 00
" " " " " " " " " " " "	33 00	28 00
" " " " " " " " " " " "	35 00	30 00
Deck plank, rough, average 35 ft.	95 00	82 00
Dressed, average 35 feet.	40 00	35 00
Pickets, rough, B. M.	20 00	16 00
4x14, 4 ft long, B. M.	6 50	5 50

Bullion Shipments.

We quote shipments since our last and shall be pleased to receive further reports:
Cons. California and Virginia, May 22, \$43,641;
Mt. Diablo, 22, \$13,917; Hanauer, 14, \$3825; 17, \$3350.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

THE Salt Lake Tribune says a fine ledge of lithographic stone has been discovered near City Creek Canyon. It has been tested in New York, and pronounced equal to the stone of Bavaria.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS

COMPANY.	LOCATION.	NO. AM'T. LEVIED.	DELINQ'T.	SALR.	SECRETARY.	PLACE OF BUSINESS.
Acme M & M Co.	California.	10.	3.	Mar 20.	June 2.	J. M. Buffington.
Alpha Cons M Co.	Nevada.	4.	25.	Apr 5.	May 15.	J. C. S. Elliott.
Andes S M Co.	Nevada.	36.	25.	Apr 10.	May 14.	J. J. Hawkins.
Belcher M Co.	Nevada.	39.	25.	Apr 22.	May 3.	C. L. Perkins.
Best & Belcher M Co.	Nevada.	45.	25.	May 17.	Jun 17.	J. L. O'Brien.
Challenge Cons M Co.	Nevada.	16.	50.	May 14.	Jun 17.	J. C. L. McCoy.
Confidence S M Co.	Nevada.	16.	75.	May 10.	Jun 13.	J. A. McGee.
Cons Imperial M Co.	Nevada.	27.	50.	Apr 17.	May 22.	J. L. McCoy.
Del Monte M Co.	Nevada.	3.	20.	Apr 15.	May 13.	J. W. Pew.
Gold Hill M Co.	California.	9.	25.	Apr 15.	May 24.	J. C. A. Gross.
Gould & Curry M Co.	Nevada.	64.	30.	Apr 25.	June 3.	J. A. K. Durbin.
Gray Eagle M Co.	California.	17.	50.	May 1.	June 10.	J. M. Buffington.
Hale & Norcross M Co.	Nevada.	35.	50.	Apr 9.	May 14.	J. A. Thompson.
Hartford M Co.	Nevada.	7.	2.	Apr 8.	May 15.	J. C. E. Elliott.
Holmes M Co.	Nevada.	15.	28.	May 19.	Jun 24.	J. C. E. Elliott.
Kentuck M Co.	Nevada.	21.	30.	Apr 24.	June 3.	J. W. Pew.
Locomotive M Co.	Arizona.	7.	5.	May 1.	June 4.	J. M. Buffington.
Mexican M Co.	Nevada.	40.	25.	May 13.	Jun 18.	J. C. E. Elliott.
Morning Star Cons M Co.	Arizona.	1.	2.	Apr 30.	May 31.	J. W. Pew.
Nevado M Co.	Nevada.	20.	50.	Apr 8.	May 15.	J. W. Pew.
North Belle Isle M Co.	Nevada.	17.	20.	Apr 8.	May 14.	J. W. Pew.
North Commonwealth M Co.	Nevada.	3.	25.	Apr 16.	May 21.	J. W. Pew.
North Occidental M Co.	Nevada.	37.	25.	May 13.	Jun 18.	J. W. Pew.
Oce Dental Cons M Co.	Nevada.	6.	25.	Apr 23.	June 6.	J. A. K. Durbin.
Peelers M Co.	Arizona.	5.	28.	Apr 23.	June 30.	J. A. Waterman.
Seg Felcher & Mides Cons M Co.	Nevada.	6.	30.	May 5.	June 9.	J. B. Holmes.
Sierra Nevada M Co.	Nevada.	37.	50.	May 10.	Jun 15.	E. L. Parker.
Silver Hill M Co.	Nevada.	26.	30.	Apr 15.	May 20.	J. C. B. Baker.
Sutter Creek G M Co.	California.	F. E. Luty.	30.	Apr 15.	May 20.	J. C. B. Baker.
Van Victor Cons M Co.	California.	L. Bruner.	35.	May 9.	Jun 13.	J. A. Cheminault.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Calcedonia G M Co.	California.	A. Cheminault.	328 Montgomery St.	Annual.	June 3
Calistoga Cons M Co.	California.	H. S. Fitch.	329 Post St.	Annual.	June 2
Grown Point M Co.	Nevada.	J. Newlands.	329 Pine St.	Annual.	June 2
Humboldt M Co.	Nevada.	J. C. Haddock.	333 California St.	Annual.	June 9
Seg Felcher & Mides Cons M Co.	Nevada.	E. B. Holmes.	389 Montgomery St.	Annual.	June 3
Silver Hill M Co.	Nevada.	D. C. Bates.	369 Montgomery St.	Annual.	May 26
Sutter Creek G M Co.	California.	F. E. Luty.	330 Pine St.	Annual.	June 3
Van Victor Cons M Co.	California.	L. Bruner.	35 New Montgomery St.	Annual.	June 2

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Champion M Co.	California.	J. Wetzel.	322 Montgomery St.	25	Jan 25
Candelaria Cons M Co.	Mexico.	G. Gato.	309 Montgomery St.	25	Apr 5
Calcedonia M Co.	Nevada.	A. S. Cheminault.	323 Montgomery St.	65	May 15
Con California & Va M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	25	Feb 10
Derbec Blue Gravel M Co.	California.	T. Wetzel.	522 Montgomery St.	10	Apr 24
Idaho M Co.	California.	J. Wetzel.	522 Montgomery St.	2	Oct 17
Mt. Diablo M Co.	Nevada.	R. Heath.	319 Pine St.	90	Oct 21
Pacific Borax Salt & Soda Co.	California.	A. H. Clough.	220 Montgomery St.	1 00	May 10

MARKET REPORTS.

Local Markets.

SAN FRANCISCO, May 22, 1890.

General trade is fair, but it would be far better if there were not an undefined uneasy feeling regarding tariff legislation, and what action Congress will take looking to the remonetizing of silver. Among leading manufacturers and prominent business men the belief is freely expressed that it is only cheap raw material or else cheap labor that will promote general prosperity in manufactured goods, although they say that by remonetizing silver a stimulating effect on all speculative securities and the leading farm and mining industries will inevitably follow.

Money continues easy under fair remittances from the interior, and a slow call for funds. There would be a freer inquiry for money were it not for the disturbed labor market. It is very generally claimed that considerable more coin will be required this year to move the wheat crop (which promises to be fully as large as that of last year) than has been wanted for all of two years past.

The steamer for Hong Kong sailed the past week, taking out the following treasure: Mexican dollars, 601,037; gold coin, \$20,155; and gold dust, \$600.

MEXICAN DOLLARS.—The demand for shipment by the China steamer was quite active, sending prices to a still higher range. The market held strong from 8@8 1/2 cents for round parcels, selling over the counter at an advance on these quotations.

SILVER.—The market has shaded off under published reports that President Harrison is unfavorable to any action by Congress looking to the remonetizing of the metal and also that he wants a party silver bill and not a national one. His course is no doubt alienating from him a large class of citizens who heretofore were his firmest supporters. With the Comstock mines running more to gold as the assays now show, it is singularly strange under what influence he is when expressing fears of remonetizing silver. Of course he is personally silent, so that his objections cannot be overcome by arguments based on sound principles, the chief of which is the revival in many lines of trade on the possibility of silver advancing to par. It is not the mining industry alone that is to be benefited, but all others, either directly or indirectly. In the local market silver has held steady at \$1.03 1/2 mint quotations. New York came through to-day at \$1.03 1/2.

QUICKSILVER.—Receipts the past week aggregate 154 fl. sks. The market has made another upward move, closing strong at the advance.

BORAX.—Receipts the past week aggregate 224 cts., and shipments in last month, by overland railroad 1228 cts. The market is easing off under freer production and more offish buying.

LIME.—Receipts the past week aggregate 4865 bbls., and exports by sea 200 bbls. to Honolulu. The coast demand is off, owing to labor troubles in some sections and fears of trouble elsewhere.

LEAD.—The local market is strong at an advance. Eastern advices report a strong and higher market under a legitimate demand by consumers who are short in stock. The past week there was exported by sea 22,063 lbs. to Victoria, and 225,094 lbs. of white lead to New York.

IRON.—The market shows another appreciation in price. Eastern advices report an active distributive trade, with a decided speculative movement on foot, due, probably, to an expected increase in the duty. Exports the past week aggregate 2027 lbs. to Victoria.

COPPER.—The market holds strong. Our Eastern advices report a strong market with heavy sales for export. The Iron Age of May 15th has the following London cable: "Prices for copper have continued to steadily advance under the influence of gradual increase in business and revival of speculative interest. Bars have risen £3 during the week and are to-day at nearly the highest point."

IRON.—The market is essentially unchanged. Foundrymen are consuming more, yet the liberal stocks here and cheaper outward English freights are against the market. The English market is controlled by speculation regardless of the stock, which is said to be low.

COAL.—Imports the past week aggregate as fol-

lows: Newcastle, 230, S. W., 8060 tons; Departure Bay, 5140; Tacoma, 2300; Nanaimo, 848; Seattle, 2700; Coos Bay, 7504; total, 19,798 tons. The market is easier for Australian and English for prompt loading. The dull freight market abroad and prospective large wheat crop on this side will attract ships to us. In coast coals there is nothing new to report. The long-threatened labor strike at the Wellington collieries has come, but it is claimed that it will be short-lived; at any rate, the trade does not appear to fear any appreciation in that grade of coal in consequence of the strike.

Eastern Metal Markets.

By Telegraph

NEW YORK, May 22, 1890.—The following are the closing prices the past week:

	Silver in	Silver in	Copper.	Lead.	Tin.
Thursday..	47 1/2	1 04	\$15 00	\$4 10	\$21 15
Friday.....	47 1/2	1 04	14 90	4 10	21 20
Saturday....	47 1/2	1 04 1/2	15 00	4 12 1/2	21 25
Sunday.....	47 1/2	1 04 1/2	15 00	4 12 1/2	21 25
Tuesday....	47 1/2	1 04 1/2	15 00	4 25	21 10
Wednesday..	47 1/2	1 03 1/2	15 05	4 30	21 10

NEW YORK, May 20.—Little Borax here; 9 1/2@9 3/4 for California refined.

Lake Ingot copper, 14 1/2; mining companies hold for 15c; largely sold under Arizona, 13 1/2; casting, 12 1/2@13c. Pig lead, stiff, 4 1/2@4 1/2; round lots; supply light.

San Francisco Metal Market.

	WHOLESALE.	THURSDAY, May 22, 1890.
ANTIMONY.		22 1/2 @ 23
BORAX—Refined, in carload lots		8 @ —
" Powdered		8 @ —
" Concentrated		7 1/2 @ —
All grades jobbing at an advance		— @ —
COPPER—		
Bolt.		23 @ 25
Sheeting.		23 @ 25
Ingot, jobbing.		17 1/2 @
do, wholesale.		16 @ 16
Fire Box Sheets.		23 @ 25
LEAD—Pig.		4 1/2 @ 5
Sheet.		5 @ 5 1/2
Pipe.		6 @ —
Shot, discount 10% on 500 bags		Drop, 1 45 @ —
Buck, 1/2 bag.		1 55 @ —
do, do, 20x25.		12 @ —
TRIPPLATE—B. V. steel grade, 14x20, to arrive.		— @ —
B. V. steel grade, 14x20, spot.		4 65 @ 4 70
Charcoal, 14x20.		6 75 @ 7 00
do, roofing, 14x20.		6 00 @ —
do, do, 20x25.		12 @ —
Pig tin, spot, 1/2 lb.		21 @ 21 1/2
COKE—Eng. ton, spot, in blk.		13 50 @ 14 50
do, to load.		14 50 @ 15 50
QUICKSILVER—By the flask.		56 00 @ 57 00
Flasks, new.		— @ —
Flasks, old.		3 1/2 @ —
CHROME IRON ORE, 70 ton.		10 00 @ —
IRON—Bar, base.		3 @ 3 1/2
Norway, jobbing.		45 @ 45 1/2
Street—English, lb.		16 @ 20
Canton tool.		9 @ 9
Black Diamond tool.		9 @ 9
Pick and Hammer.		8 @ 10
Machinery.		4 @ 5
Toe Calk.		4 1/2 @ —
Spot.		To Load.
IRON—Glengarnock ton.		35 00 @ —
Edgmont, ton.		35 00 @ —
American Soft, 1/2 ton.		32 @ —
Oregon Pig, ton.		27 @ —
Puget Sound.		35 00 @ —
Old Lane White.		27 @ —
Shomo, No. 1.		35 00 @ 35 00
Bar Iron (base price) 1/2 lb.		— @ —
Langdon.		35 00 @ —
Thorncliffe.		35 00 @ —
Garsheir.		35 00 @ —
Shomo, No. 2.		35 00 @ —
Thomas.		35 00 @ —
Cargolite.		32 50 @ —

Coal.

TO LOAD.				Per Ton.
Australian ...	7 25	@ 7 50	Lehigh Lump...	16 50@17 00
Liverpool S&M	8 00	@ —	Cumberland bk	16 00@ —
Scotch Splint.	8 00	@ 9 00	Egg, hard...	15 00@ —
Cardiff...	8 50	@ —		
SPOT FROM YARD.				
Wellington.....	\$ 9 00	Seaside.....	7 00	
Wretha	9 00	Coos Bay	6 00	
Westwater Brymbo.	9 00	Cumberland	12 00	
Nanaimo	9 00	Egg, hard	17 00	
Sydney	8 00	Cumberland, in sacks	15 00	
Giluan	7 00	do, bulk	14 00	
CANADIAN ANTHRACITE COAL.				
Egg, ship side	\$12 50	Stove, yard	\$15 00	
Egg, yard	15 00	Nut, yard	15 00	

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING May 1.	WEEK ENDING May 8.	WEEK ENDING May 15.	WEEK ENDING May 22.
Alpha.....	1.00	1.35	1.00	1.30
Alta.....	1.20	1.30	1.10	1.25
Andes.....	1.35	1.50	1.30	1.45
Belcher.....	1.15	1.20	1.10	1.20
Best & Belcher.....	3.00	3.40	2.85	3.10
Bullion.....	1.05	1.30	1.05	1.25
Bodie Con.....	.65	.75	.70	.75
Bulwer.....	.25	.25	.25	.25
Commonwealth.....	3.30	4.30	4.00	4.35
Con. Va. & Cal.....	4.65	4.95	4.25	4.40
Challenge.....	2.30	2.40	2.15	2.35
Chollar.....	2.40	3.45	2.40	2.55
Confidence.....	5.50	6.10	4.60	5.00
Con. Imperial.....	35	45	35	40
Caledonia.....	25	7	45	65
Crown Point.....	2.00	2.50	2.45	2.60
Crocker.....	.25	.25	.30	.25
Del Norte.....	.85	.95	.80	1.00
Eureka Con.....	1.00	1.60	1.00	1.10
Excelsior.....	.65	.70	.65	.70
Grand Prize.....	.80	.90	.80	.85
Gould & Curry.....	1.60	1.60	1.50	1.55
Hale & Norcross.....	2.30	2.60	2.00	2.10
Julia.....	.25	.30	.25	.25
Justice.....	1.30	1.50	1.40	1.55
Kentucky.....	.30	.35	.25	.30
Lady Wash.....	.30	.35	.25	.30
Mono.....	.45	.45	.45	.45
Mexican.....	3.25	3.65	2.95	3.25
Navajo.....	.25	.30	.25	.25
North Belle Isle.....	1.65	1.85	1.50	1.60
Nor. Queen.....	.60	.65	.60	.65
Occidental.....	1.10	1.45	1.05	1.15
Ophir.....	3.60	4.00	3.50	3.70
Overman.....	1.40	3.05	2.10	2.35
Potosi.....	3.00	3.75	2.75	3.10
Peerless.....	.20	.40	.30	.35
Perr.....	.30	.40	.25	.30
Savage.....	1.85	2.25	1.95	2.10
S. B. & M. Cal. & Va.....	1.30	1.40	1.30	1.40
Sierra Nevada.....	2.30	2.5	2.15	2.35
Silver Hill.....	.25	.25	.20	.20
Scorpion.....	.20	.20	.15	.20
Union Con.....	2.55	2.85	2.60	2.85
Utah.....	.20	1.40	.35	.45
Yellow Jacket.....	2.60	2.90	2.50	2.60

Sales at San Francisco Stock Exchange.

THURSDAY, May 22, 9:30 A. M.	80 Mexican.....	3.10	
50 Alta.....	1.10	550 Nev. Queen.....	70c
600 Alpha.....	1.30	100 N. Belle Is.....	27c
1000 Andes.....	1.50	400 Occident.....	1.00
100 Belcher.....	1.85	400 Ophir.....	4.10
200 B. & Belcher.....	2.85	100 Overman.....	2.35
650 Bullion.....	1.10	600 Peerless.....	35c
200 Caledonia.....	4.10	400 Potosi.....	4.75
100 Challenge.....	1.10	800 Sierra Nevada.....	1.85
750 Chollar.....	3.30	450 S. B. & M.....	1.30
125 Crown Point.....	2.25	100 Scorpion.....	2c
500 Con. Imperial.....	40c	65 Savage.....	1.95
500 Con. Cal. & Va.....	4.60	100 Utah.....	5c
200 Excelsior.....	65c	200 Union Con.....	2.55
800 Hale & Nor.....	2.70	550 Yellow Jac-et.....	2.75
100 Julia.....	.25c		

Mining Share Market.

The mining share market the past week was quite active, with lively fluctuations at advancing prices. The way in which some of the stocks jumped up and fell back caused the more credulous to believe that the ore body was being moved from mine to mine at a lively rate, so as to give all a show. The active up movement was naturally expected by careful operators. This we predicted in last week's PRESS, for the mill-ring and pool bought stocks on the down grade, which they wish to sell out so as to collect the ten assessments, aggregating about \$250,000, that fall delinquent in the forefront of next month. Of course, if the public does not take the stocks at the figure the pool would sell at, still higher prices will be made to induce buying, after which—well, what has always followed: low prices and more assessments later on. The mines were never in better condition than at present for a sterling deal, for the pool or ring can run into ore at any time, so as to give an excuse for higher prices, and they can, with equal ease, run out of ore, so as to break prices, and at the same time get away with the boodle. The public need not expect a different condition of affairs until there is a change in the management of the mines. Stock brokers should do all in their power to bring about a reform, and no broker having any regard for his good name, unless he is in the boodle-ring, should give proxies for stocks standing in his name over which he has no control. Elections are coming on, and it is policy to let those who wish the boodle buy the stock for control in the open market, and then we can look for more active times.

The mill-ring continues to grade the ore milled on the Comstock, so as to keep off dividends and get more boodle. It is reported that the last quarterly boodle division aggregated over \$700,000.

From the Comstock, our Virginia City advises report that the pumps for pumping out the Gold Hill mines will be in place about the 1st of next month, and that pumping will commence soon afterward. Our correspondent also says that the most important strike on the Comstock for years is the west ore body in the Gold Hill group of mines, commencing with 10 or 12 feet of ore found, last December, in Con. Imperial, near the Alpha south line, on the 300-foot level, and later on in the upraise from the 500-foot level on the same body found in Confidence and Challenge, followed by the last find in Confidence, 250 feet west from the 800 lateral drift that is being run from Yellow Jacket to the Con. Imperial shaft. They have started a west crosscut on this level in Challenge near the north line, to prospect the ore found in Confidence, in Crosscut No. 1, mentioned above.

A reliable person informs us that in Overman, on the Suro tunnel level, they struck, some time since, a body of rich ore lying west, when they came back and sunk a winze 70 feet deep from the bottom of which a northwest drift was started to tap the ledge lower down. In running this drift they encountered the ore body, which was about 40 feet wide, the average assay of which was about \$50 a ton. Our informant thinks that the present management, if they keep control of Overman, will mill for themselves and grind out assessments for mine stockholders.

Con. Virginia has sent to the Carson Mint, to date, over \$56,000, and Crown Point over \$10,000, on May account.

We learn from a reliable source that there is a decided improvement in Savage and also in Hale and Norcross. In Potosi, the improvement in the winze mentioned by us, week before last, is officially confirmed. Chollar still shows well. An improvement is also reported in Overman.

THAT COPPER SYNDICATE.—At the trial, in Paris, of the Copper Syndicate men it has been proved that Secretan, as director of the Societe de Metaux, distributed fictitious profits for 1887 and used improper means to haul copper, raising the price from under 1000 francs per ton to over 2000 francs, and clearing within two months 10,000,000 francs. The defense is that the article of the Penal Code on which the charge is based does not apply. Ilentash, on being examined, admitted that while he was chairman he knew nothing of the dealings of the institution with the Societe de Metaux. He also testified that the Board rarely listened to the manager's reports and let things slide.

ACADEMY OF SCIENCES.—At the meeting of the California Academy of Sciences on Monday evening, Fr. Gutzkow exhibited some specimens of manganese ore found at the junction of Nineteenth street and the Corbett road. The deposit was referred to in Prof. Whitney's Geological Survey report, but has of no commercial value. C. E. Engerman read a brief paper on "Egg Membranes or Covering of Eggs in Fishes."

Assessment Notices.

ACME MILL AND MINING COMPANY; Location of principal place of business, San Francisco, California. Location of Works, Amador County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 30th day of March, 1890, an assessment, No. 10, of 3 cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 11, No. 303 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of May, 1890, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 9th day of June, 1890, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
J. M. HUFFINGTON, Secretary.
Office, Room 11, No. 303 California Street, San Francisco, California.

The delinquent day of the above assessment is hereby POSTPONED to June 2, 1890, and the day of sale to MONDAY, June 23, 1890.

By order of the Board of Directors.
J. M. HUFFINGTON, Secretary.
San Francisco, May 15, 1890.

GRAY EAGLE MINING COMPANY, Location of principal place of business, San Francisco, California. Location of Works, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 1st day of May, 1890, an assessment, No. 17, of five (5) cents per share, was levied upon the Capital Stock of this Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 11, No. 303 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 10th day of June, 1890, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 30th day of June, 1890, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
J. M. HUFFINGTON, Secretary.
Office, Room 11, No. 303 California Street, San Francisco, California.

GOLD HILL MINING COMPANY—Location of principal place of business, San Francisco, California; location of works, Grass Valley, Nevada County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 17th day of April, 1890, an assessment (No. 9) of Twenty-five Cents per share was levied upon the capital stock of the Corporation, payable immediately in United States Gold Coin, to the Secretary, at the office of the Company, Room 20, Phelan Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 24th day of May, 1890, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 10th day of June, 1890, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.
C. A. GROW, Secretary.
Office, Room 20, Phelan Building, San Francisco, California.

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A MIDDLE-AGED MAN BY THE NAME OF JOSEPH McLEARN, Miner, left Nova Scotia 17 years ago for California. His friends would be thankful to any person who could give any information concerning his whereabouts.

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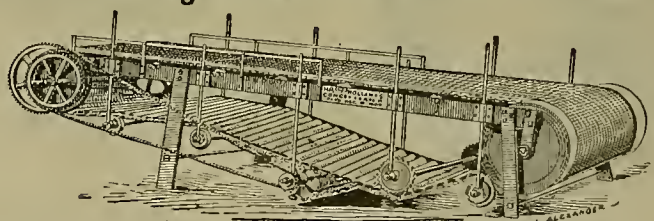
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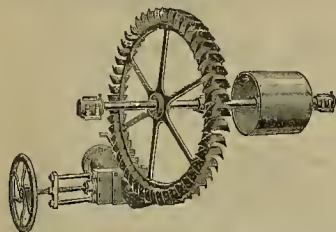
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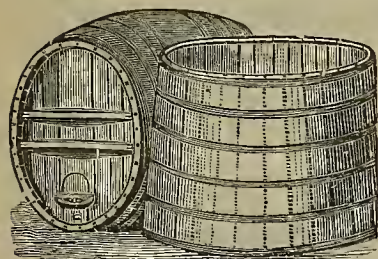
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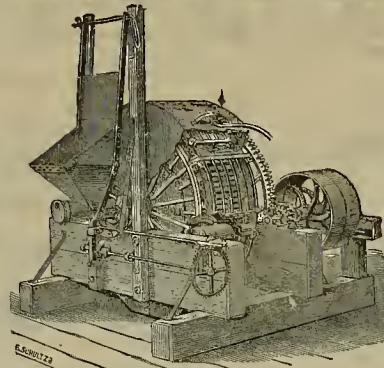
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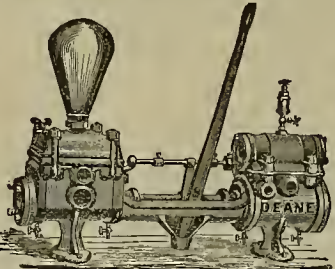
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COAL MINES OF THE WESTERN COAST.

A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

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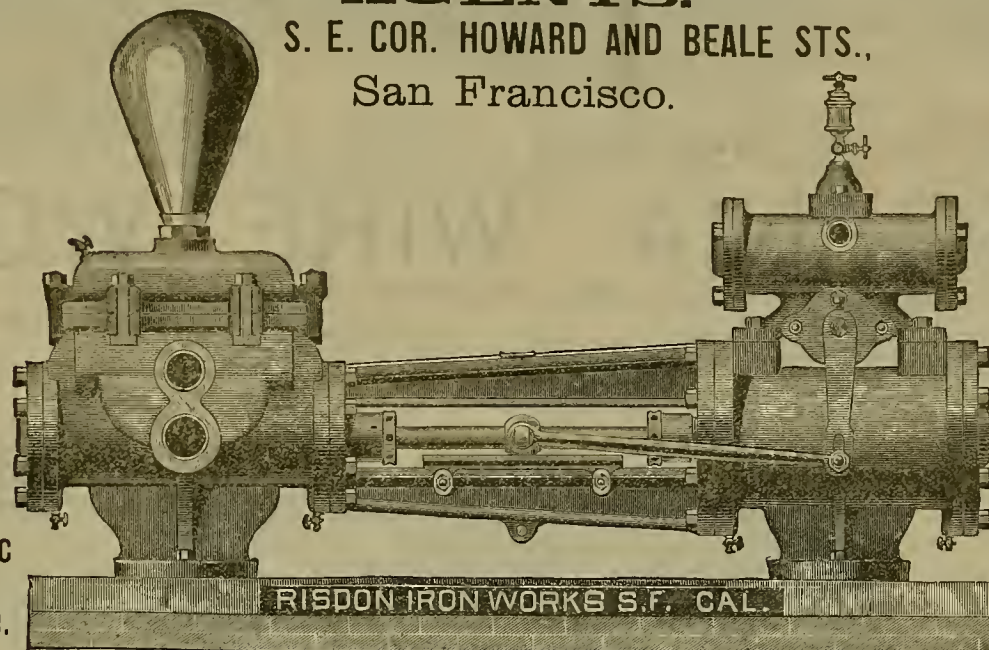
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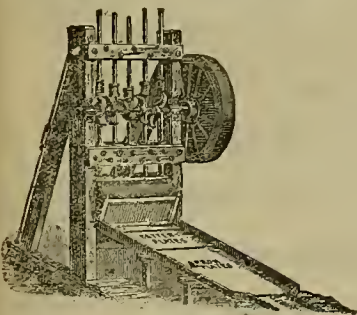
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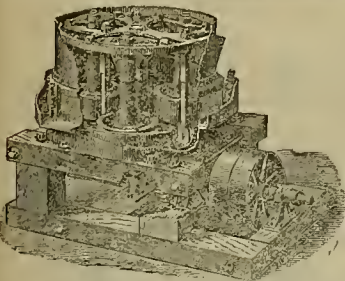
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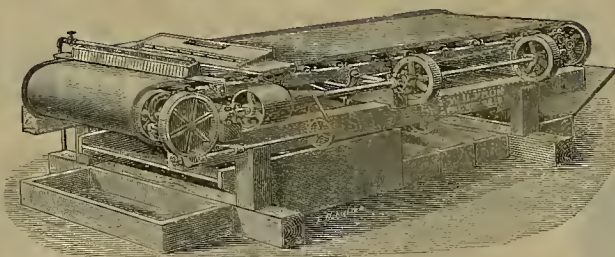
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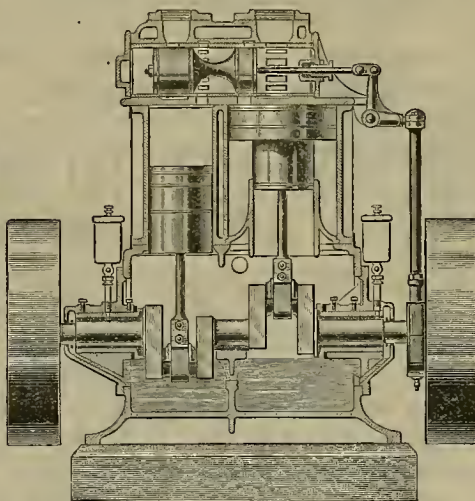
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SAN FRANCISCO, SATURDAY, MAY 31, 1890.

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Fig. 13.—AN ICE ARCH OR NATURAL TUNNEL UNDER A GLACIER.

The Deep Gold Placers of California.

NUMBER IX.

[Written for the Press and copyrighted 1890, by HENRY G. HARRIS, F. G. S. A., F. G. S.]

Glacial Rivers.

There are natural tunnels and passageways under all glaciers, through which streams born of the snows rush with great impetuosity. These are known to Alpine travelers as "ice arches." Fig. 13 is from Cox's "Travels in Switzerland."

Running water adds to the working capacity of the glaciers. The torrents at times flow on the surface, at others plunge down the crevasses in cataracts, carrying sand and stony fragments which, impinging on the generally soft bedrocks, wear away the surface and form the so-called "pot-holes," in which, when uncovered centuries afterward, worn boulders and gravel are found at the bottom of this natural hydraulic shaft, revealing the agencies employed by Nature in this work. The crevasses naturally close or move on and appear like empty mining shafts, the water finding a new opening. The pot-holes are hurried out of sight and remain as occasionally discovered by the venturesome drift or hydraulic miner of the present time.

On the ice-worn coast of Norway, pot-holes of unusual size are found uncovered, which no doubt were so formed, and the supposition is that very many more exist which are hidden from view; they are called "giant kettles."

Under favorable conditions, pot-holes are sometimes formed in river-beds. This may as likely take place under a glacier as in the bed of a modern river free from ice.

Small streams generated by the melting ice

also flow over the surface of glaciers, descend through fissures and connect with the torrent beneath. When a large stream plunges down a crevasse cataract-like, it is called the "glacier mill" or "monlin."

Numerous sub-glacial streams, four of them of considerable size, flow under the Alaskan Muir glacier. These are about three feet deep and from 20 to 40 feet wide. The grade is from 150 to 250 feet to the mile, which causes a very rapid current. The deeply-running river beneath the ice can be distinctly heard by a person on the surface. (Wright's "Ice Age in North America.")

In Greenland, great rivers flow in summer over the ice sheet and are precipitated down gigantic crevasses.

This universal presence of flowing water

under glacial ice will account for all river phenomena noticed by miners and scientific observers in the deep channels of California, and it is not surprising that early gold miners should attribute them wholly to fluvial action.

The following are quotations from Tyndall, Cox, Geikie and others, pertinent to this subject:

"Having admired the Arch of Ice," etc. . . .

"A glacier so covered with earth and stones as to hear at a short distance the appearance of a small hill is seen. From this glacier issues a torrent roaring loud, of troubled water which is the source of the river Aar." . . .

"The Aar rushes with more impetuous rage than even the Rhone or the

Rhone, and it is frequently so swelled with torrents as to ravage all the surrounding country. We saw many traces of these terrible devastations."

. . . "Arrived at the bottom of the inferior glacier forming a magnificent arch of ice from which issued a noisy, rapid torrent of snow-water."

"The river Arve is joined by the Arveiroo, near Chamouni; the latter emerges from a glacier (Glacier des Bois). An ice cliff has an arch from which this river seems to have birth, the roof of which in summer is continually falling."

"A torrent the first source of the Rhone, in summer, is turbid; in winter is transparent as crystal. When the accumulation of snow prevents it from flowing under the glacier of the Furca, it forms a lake; overflowing, it flows over the ice and continues on its course; the Rhone running beneath the ice could be distinctly heard." . . . "During some seasons the river Rhone, a gray torrent of snow-water, issues from an ice cavern."

"The Rhone hursts in two streams from the bottom of this glacier; although scarcely three feet deep, the water rushed with such violence as nearly to overturn the guide."

"It was curious to observe the numerous little rills produced by collection of drops occasioned by the thawing of the ice on the upper part of this glacier." . . . "These little rills hollow out some channels, and, torrent-like, precipitate themselves into the chasms, increasing the body of water formed by the melting of the interior surface, which, finding an outlet under the immense arch of ice, flows into the valley of Chamouni," etc.

Rivers, many of which have their sources at the feet of mountain glaciers, follow any accidental depression that may have been formed by the prime causes already referred to. Water can by no possibility rise over intervening high lands, but must find its way as best it can always downward to the sea.

A crevasse is at first a crack in the ice which widens with the plication of the mass as it flows over the irregular bedrock below. The yawning crevasses have their origin in similar fissures. The first manifestation of a new fissure, according to Tyndall, "is a sound like an explosion, followed by the rising of air bubbles."

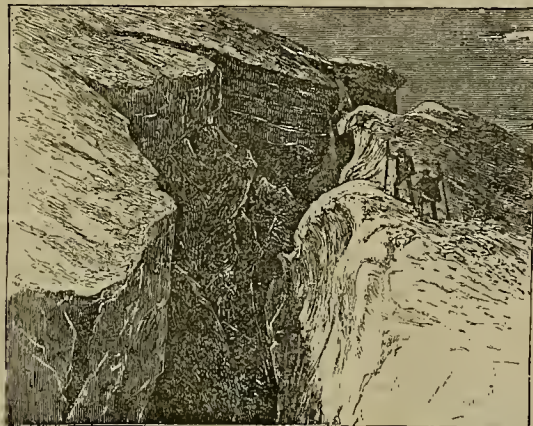


Fig. 15.—CREVASSE, GRAND PLATEAU.

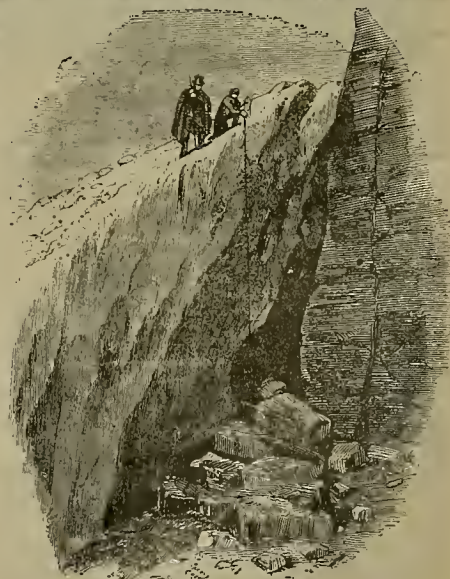


Fig. 14.—CREVASSE, MER DE GLACE.

The first crack is so narrow as scarcely to be seen; it is in no place wide enough to allow the insertion of a knife blade."

The cracks widen as the ice stream flows, until they form broad and deep chasms extending to the very bottom of the ice mass, moving with the ice river. Sometimes they quite close again, and are obliterated long before their position reaches the termination of the glacier.

They often connect with the bottom of the glacier beneath which the river flows with greater impetuosity than in open channels. Down these openings whole trees are carried by the powerful streams which by the same force are stripped of their branches and left on the bedrock by the retreating crevasses, to become in after ages the lignite and silicified wood which the California gold miner pipes out of the hydraulic banks, or the drift miner meets with in his tunnels far underground. The same road could be traveled by the bones of ancient animals, and if it is true that human implements are sometimes found under conditions not formerly well understood, may not this be at least a reasonable supposition as to their placement?

Moulines have been sounded for 100 to 300 feet without finding bottom.

In the valley of Hasli, the river Aar plunges down a crevasse 200 feet deep.

In 1820, three guides were swept by an avalanche into a crevasse on the side of Mont Blanc; forty years after, their bodies were found near the terminus of the "Glacier des Bossons," miles below the crevasse into which they fell. Fig. 14, after Gaikie, represents a crevasse in the Mûr de Gace. Fig. 15, is from Tyndall's "Forms of Water."

Incipient or Snowdrift Glaciers.

While the working capacity of the true glacier is admitted, we may not ignore the effects produced by small patches of snow which come and go with the seasons. Lying for a time on the steep mountain-sides, too transient and too small to be dignified by the name "glacier," they yearly perform their humble labors, and in the aggregate, by dint of constant work while they last, contribute much to the detrital matter found in the true glacial channels, the canyons and watershed of the lower foothills and plains.

I had an opportunity to note these baby glaciers during a recent visit to Pinamas and Sierra counties. I was surprised to find them all at work, a fact demonstrated by the small muddy stream that issued from the foot of each. A close examination showed that matter was being loosened from the mountain-sides by the slow downward movement of the snowdrift, and carried away in water melted from the snow by the warmth of the sun. That the snow patch was actually moving, glacier-like, was proven by curved lines on the surface. This discovery led to the thought that the work of these snow bodies, continued for centuries, might materially assist in the great geological work, the evidence of which was seen on every side.

The amount of mineral matter crushed by creeping ice, and washed away by mountain ice-born streams, is enormous. The effects of this stupendous work may be seen almost everywhere in the high Sierra Nevada mountains of California. I have from Spanish Peak looked over to Pilot Peak, and from Pilot Peak back to Spanish Peak, across the great undoubted glacial erosions of Pinamas county, a sight well worth the journey to the locality. A sketch view is shown in Fig. 16. [This cut was incorrectly placed on page 337, in Article No. VII of this series, and is here reproduced. The cut which should have been given, on that page is Fig. 7, which is shown in this issue.—EDS. PRESS.]

The following facts, selected from works on this subject, are illustrative of the great geological changes wrought by ice:

"From the foot of the Aar glacier, with a computed area of 60 square kilometers, not the largest in Switzerland, 440,000,000 gallons of water, containing 280 tons of sand, flow away daily in the month of August."

"The Justedal glacier in Norway discharges one million kilograms of sediment in one July day, and the total annual discharge from the ice-field, covering 830 square miles, is estimated at 180 million kilograms, besides 13 million kilograms of mineral matter in solution. Assuming the specific gravity at 2.6, the basin of the glacier is believed to lose 69,000 cubic meters of solid rock annually, or a cube measuring 41 meters a side."

Prof. Wright estimates the whole annual sediment conveyed to the bay by the sub-glacial streams of the Malak glacier in Alaska at 33,274,804 cubic yards. "This would furnish one inch of sediment per year to be spread by this single glacier over the bottom of Glacier bay, confirming the recent recession of the glacier from the lower portion of the bay, since otherwise it would now be filled with sediment. There are four other large glaciers now entering the inlet."

Glaciers frequently scoop out lake basins or increase the depth of natural depressions. Many attestations of this fact may be seen in the Alps. Some of these lakes cover a large area, and like Lake Tahoe in our own State, are very deep. Lake Maggiore in Italy is 1233 feet deep, 35 miles in length, and from 3 to 7 miles wide; the surface is 640 feet above sea level. The Lake of Como, also in Italy, is 30 miles long and its extreme width is 2½ miles. Its greatest depth is 1341 feet, but its average depth is much less. The Lake of Geneva in

(Continued on page 369.)

CORRESPONDENCE.

We admit, unadvised, opinions of correspondents.—EDS.

Note on Expelling Coarse Sand From Settlers.

[Written for the P.M.S.]

If settlers were made on the principle of the rough one described in my little book on "Testing and Working Silver Ores," there would be less difficulty in getting the coarse sand out, and any lumps of rock or iron, keys, etc., which might and often do find their way into the settler, would be taken care of without trouble to the attendant or injury to the machine.

When I took charge of the mill here, I found a number of boxes full of coarse material which included a large quantity of quicksilver. This had been removed from the settlers from time to time as it accumulated in them, and had been something of an elephant on the hands of the millman whose only method of disposing of it, to a greater or less extent, was to regrid it in the pans and again wash it in the settler.

An experienced panman who worked here knew of no better way until I taught him the method which I discovered many years ago, and have used with satisfactory result, even with the unscientific settlers usually supplied with mills. This method is as follows: Drive the settler at high speed as possible without injury to other machinery (batteries may be hung up for a time if necessary); fill it with water; remove a plug at about half-way between the surface and the bottom of the water, and in its place put a half or three-quarter, etc., plug. The object is to allow the water to escape as fast as it enters (and that should be as fast as the supply pipe will deliver it) while still keeping the settler full. Very coarse and heavy sand will rise to the outlet and escape, as it would never do if the outlet were not considerably below the surface of the water. In about an hour the accumulated coarse, heavy sand from several days running in the ordinary way will be expelled, and no quicksilver will be lost. If there remains a little still coarser stuff, as lumps of rock, etc., it must be removed by hand after stopping the machine.

The knowledge of such little things as this contributes to the difference between a good millman and a poor one, but I think this will be a pointer to several pretty good millmen, and may be so to some manufacturers of settlers.

The principle of a settler to which I allude above, and which is but imperfectly carried out in any settler in the market that I know of, is:

1st. By rapid motion and suitable arrangement of the stirrers, all granular matter is kept suspended in water, circulating upward at the periphery and downward near the center until the diffused globules of quicksilver have united to form masses too heavy to be lifted by the current.

2d. A deep groove surrounding the false bottom affords to these masses of quicksilver, as soon as they become heavy enough to remain in it, a refuge from the disturbing action of the stirrer.

3d. The construction of the arms and their arrangement is such as to sweep the bottom from the cone to the circumference, slightly rubbing the quicksilver in the pulp to make it unite, and pushing it, as well as rocks, pieces of iron, etc., into the groove, while the false bottom projecting over a part of the groove forms a recess into which the rocks, etc., are forced by the reactionary water current, there to remain until removed by the operator.

In case of granulation of the quicksilver, certain more or less known chemical effects may be utilized to assist its agglomeration.

With a settler of this kind it is never necessary to remove the lowest plug until the water has to be drained out, and if the quicksilver is in good condition the loss is not greater (it may be less) than with the ordinary machine, for no settler can save granulated quicksilver unless it retains also a quantity of sand.

All this is explained in the little book mentioned, and though that book is now to a great extent out of date, it is not so in this matter, for I have yet to see a really good settler for silver mills on this market. The worst settlers are those which have plowshares and cultivators which only plow up the sand and quicksilver together; the miller settlers, with wooden blocks, are not so bad.

Santa Lucia, Honduras C. H. AARON.

Mines and Mills of Shasta County.

NUMBER III.

[From our Traveling Correspondent.]

When I last wrote I was on my way to Shasta town, the once liveliest, wealthiest place in Northern California. It is now a silent camp, comparatively, still there are a number of nice, well kept residences, good hotel, several stores, post and telegraph offices, and a live and very readable newspaper, the Shasta Courier. Business comes more from the surrounding camps than the town, as the population is not over 300, I think. The main feature of the place is that it is the location of

the U. S. Land Office for this district, but this is now ordered to be transferred to Redding. Shasta is by all odds to be preferred to Redding in summer months. Here the water is fine, the weather fine, and the scenery grand. Shasta, as I see her, with a large though undeveloped quartz interest surrounding, will never be any worse off than at present. If they would develop the mines here, as they would the same properties in any other county of the State, Shasta would be to this, as Grass Valley is to Nevada county, a very lively, beautiful mining town.

It is useless to give any detailed account of the several, I will say many, quartz lodes I saw, some of which by development would no doubt make good mines; there are plenty of them within a radius of three miles around Shasta. The main drawback is want of water in summer, but this should be no obstacle, as the Sacramento river is within 3½ miles, and all downhill. The time is coming when along the borders of the Sacramento river is going to be the seat of the greatest gold-producing sections of the State, for the reason that it flows through a long section of mineral country—all through Shasta and well into Siskiyou county. It is a never-failing stream and has an abundance of water at the lowest stage in summer, and from Redding up there is a lively current that can be utilized for power by current float wheels.

The principal mining plant in the vicinity of this town is the Iron Mountain Company, located some seven miles north. The lode is an immense one, in some places over 100 feet wide, carrying copper, silver, lead, and gold, with iron sulphurets in immense quantities. The ore is worked mainly for its copper and silver, or rather I should say, for the silver with the copper. It is first crushed dry, then roasted in revolving furnaces, and worked in pans with quicksilver, making of course poor bullion, and a heavy loss of mercury. If this mine was in Colorado, Hill would make it; they would do the same in Montana, and why would it not be the best way for California? Then sell the matte to refiners. I will not undertake to give an account of the underground workings, which are quite extensive.

The mill consists of 20 stamps, 16 combination pans, and any amount of accompanying machinery. They have steam-power, and fine engines and boilers. The buildings and mine give evidence of there having been a large amount of money expended. This may be considered rather a meager description for so large a plant, but in the absence of Mr. Saltee, who is superintendent and one of the owners, it was impossible to get all that might have been had by consulting him.

There is a shyness among employees in giving information, which they are not to be blamed for, nevertheless it sometimes is well to talk a little. It doesn't matter much, as your correspondent can pick up enough with his eyes for practical and instructive purposes.

Mount Cory Mill.

The \$750,000 mill and reduction works just dismantled at Mount Cory, Esmeralda county, Nev., was the largest structure of the kind in the State and covered an area of several acres of ground, and several million feet of lumber were consumed in its construction. Rollers weighing 13 tons were used in place of stamps for crushing ore. The mill was a dry crusher, and after the ore was pulverized it passed through a series of screen apartments and dust chambers, and was finally conveyed into huge redwood tanks to go through a chemical process.

The failure of the Mount Cory ore to pay is attributed to its containing a large percentage of lead, the silver escaping with that metal, from which it was impossible to separate it by the process adopted at the Mt. Cory mill. Its complicated construction is illustrated in the statement of a Candelaria mine-owner who says he shipped 50 tons of high-grade ore from that district to the Mt. Cory mill for reduction. After the ore was dumped into the feeders or hoppers, nothing was ever afterward seen of either the ore or the metal it contained, and it is supposed that the pulverized ore was blown away in passing through the dust chambers.

The site of the mill is located several miles from the mine, where there is neither fuel nor water, whereas at the mine there is plenty of both. There is no mineral patent on the Mt. Cory mine, but it is covered by a timber patent including 3000 acres, and is therefore not relocatable.—Virginia Chronicle.

LITTLE VALLEY.—Two experienced prospectors are preparing to start for the head of Little Valley, west of Franktown, as soon as the snow disappears, to search for the quartz vein from which the gold drifted, found in the ravine near the old Marlette millsite, which was worked by the hydraulic process in the early "sixties," and is said to have yielded \$160,000. Quartz surface-croppings are visible at several points on the divide separating Lake Tahoe from Little Valley.—Virginia Chronicle

The Virginia Chronicle says: A measurement of the water flow of the Carson river by United States engineer corps officers shows a volume of 2508 cubic feet (equal to 125,000 miners' inches) at Rodenhahz, and 30,000 at Woodford's.

Coast Industrial Notes.

BASALT BLOCKS are no longer in great favor for paving, the tendency being toward bituminous rock.

The cable for the Piedmont cable road has arrived, and an experimental car has nearly been completed.

THERE are several hundred men employed in this city in working tin and sheet iron and in making metal cornices for buildings, etc.

IN surveying the Grand Canyon of the Colorado for a railroad, Engineer Stanton and party ran a line across a natural bench of white marble that extends 20 miles down the canyon. It is wide enough for a four-track road, and is at the average height of 80 feet above the river.

THE United States is at present the only good market available for canned salmon, mainly on account of the low prices prevailing. The principal demand is for Alaska fish, the greater part of this year's pack of which will probably remain in the United States, although a very considerable portion is of inferior grade. Of late years a trade in second-class brands has been worked up in the Southern States.

AUTHENTIC reports from the oil-fields in Ventura county are to the effect that considerable excitement has been caused there by an increased flow in many of the oil wells. In three wells the flow increased over 200 barrels each in one week. A number of Pennsylvania parties are looking over the field and speak very highly of the prospect. Considerable money is being invested in development.

THE revenue from the manufacture of whisky has entirely ceased, the local distillers having been totally frozen out by Eastern competition. As one of the men who was once in this business put it: "The tax on whisky is 90 cents per gallon, and Eastern men sell whisky here for \$1.05. Now, they either furnish the whisky, the casks, and pay the freight out of that odd 15 cents, and still make a profit, or else —," and he shrugged his shoulders.

THE merry buzz-saw is now mangling the saw logs, and the tuncful hum is pleasant music. The Truckee Lumber Co. started their mill Monday, and the Boca mill commenced work yesterday. Geo. Schaffer was intending to commence to day. The other mills will start up in a few weeks. Most of the mills have logs enough on hand to last a month or six weeks, and by that time the loggers can get into the woods for a fresh supply.—Truckee Republican.

THE beet-sugar industry at Alvarado is to have its capacity doubled, so that 300 tons of beets can be handled per day. New machinery will be put in, and it will then require 12 boilers to run the mill. The present company this year pay out \$120,000 for beets alone. Over 1500 feet of beet-sheds will be constructed at once. They have already let contracts for 1500 acres of beets. The total expenses this year will run up between \$250,000 and \$300,000.

DURING the past week or so there is noticeable a very marked falling off in building business. The number of contracts let has diminished perceptibly, and the cause is said to be the introduction of the eight-hour movement, which is equivalent to an increase in the cost of labor amounting to one ninth. Architects mention the fact that intending builders have declined to carry out their intentions on account of the change of hours. What diminution there may be on this account is added to by the approach of the holiday season and the attention being devoted to summer pleasures beyond the city.

SOME fine blocks of marble are being taken out at the Inyo Co. quarry. One of these weighs 15½ tons; it is a beautiful stone without a flaw. Much larger blocks could be taken out if it were possible to ship them. There is a block of moss-agate marble ready for shipment that weighs ten tons. The beauty of this stone cannot be duly appreciated without being seen. The mill for working the marble will be provided with the very best machinery and most improved appliances of all kinds. It is a serious loss to Owens Valley that the mill is not located there, instead of at Verdi, 350 miles away from the quarry.

NEAR Cordella, or Bridgeport, Solano Co., for several years past, there have been from 50 to 150 men employed on the low hills getting out paving blocks for San Francisco and other cities. It was a thriving and busy community, and the few business men in the place were prosperous. Quarrymen and blockmakers received from \$2.50 to \$4 per day for their labor, and Bridgeport resembled a mining camp of the early days. Now this is all changed. Rent advances from there would seem to indicate that the quarry business is dead, and perhaps never to be resumed. So far the present season has not been an auspicious one at Bridgeport. The hills are tenantless.

AN examination of the Internal Revenue Collector's books discloses a remarkable falling off in the amount of the receipts from the tax on cigars. From 1882, when a total of \$988,606 was collected, to 1889, when only \$389,352 was paid into the office from this source, the decline has been steady, and about in an even proportion each year. Of course this reduction in revenue meant a corresponding reduction in the manufacture of cigars. A reporter interviewed several cigar manufacturers as to the reason for the falling off, and all predicted a dismal future for the business. They ascribed

its decline on the coast to their inability to compete with Eastern firms, and also to a prejudice against Pacific Coast cigars, because of the impression abroad that they are all manufactured by Chinese labor.

The mill-owners of Oakland are quietly waiting for June 1st, when the day of proceedings granted by the Carpenters and Joiners' Union ceases. This union has adopted a resolution enjoining the members from working with non-union men in the same building, or planing-mills, or stair shops, under penalty of fine or expulsion. The mill-owners have adopted, in view of this, the following: *Resolved*, That in order to counteract and nullify the effect contemplated by the resolution adopted by the Carpenters' Union, we mutually pledge ourselves, one with another, that we will not hire any man (for at least two weeks) who combines with others to bring about a strike on any building, in any planing-mill, or stair-building shop because of there being non-union men employed in those places; and he it further *resolved*, that every contractor, mill-

the machines tried had bruised the fiber, and the use of water was necessary to work it by that process. The Van Buren gets the fiber out in perfect condition, and there is no water required. The company's plants average about four feet in height, with leaves measuring 18 inches in width. In the 18 months the doctor has given to the study of the industry, he has come to the conclusion that for commercial purposes the maguay should be gathered early in the year. The company have built a good wagon-road to the coast, twelve miles distant, where, at Santa Rosalia bay, they have one of the best harbors on the lower coast. Livingston & Clark's vessel now carries mail for them. It is undecided yet whether the fiber, when dry, will be shipped direct from Santa Rosalia to England, or San Francisco and reloaded for the old country.

The German bark *Ventura* is due here from Antwerp with \$100,000 worth of beet-sugar machinery on board. The machinery was ordered by Claus Spreckels about a year ago, hoping to set it up in time for this year's crop

A Famous Manzanita.

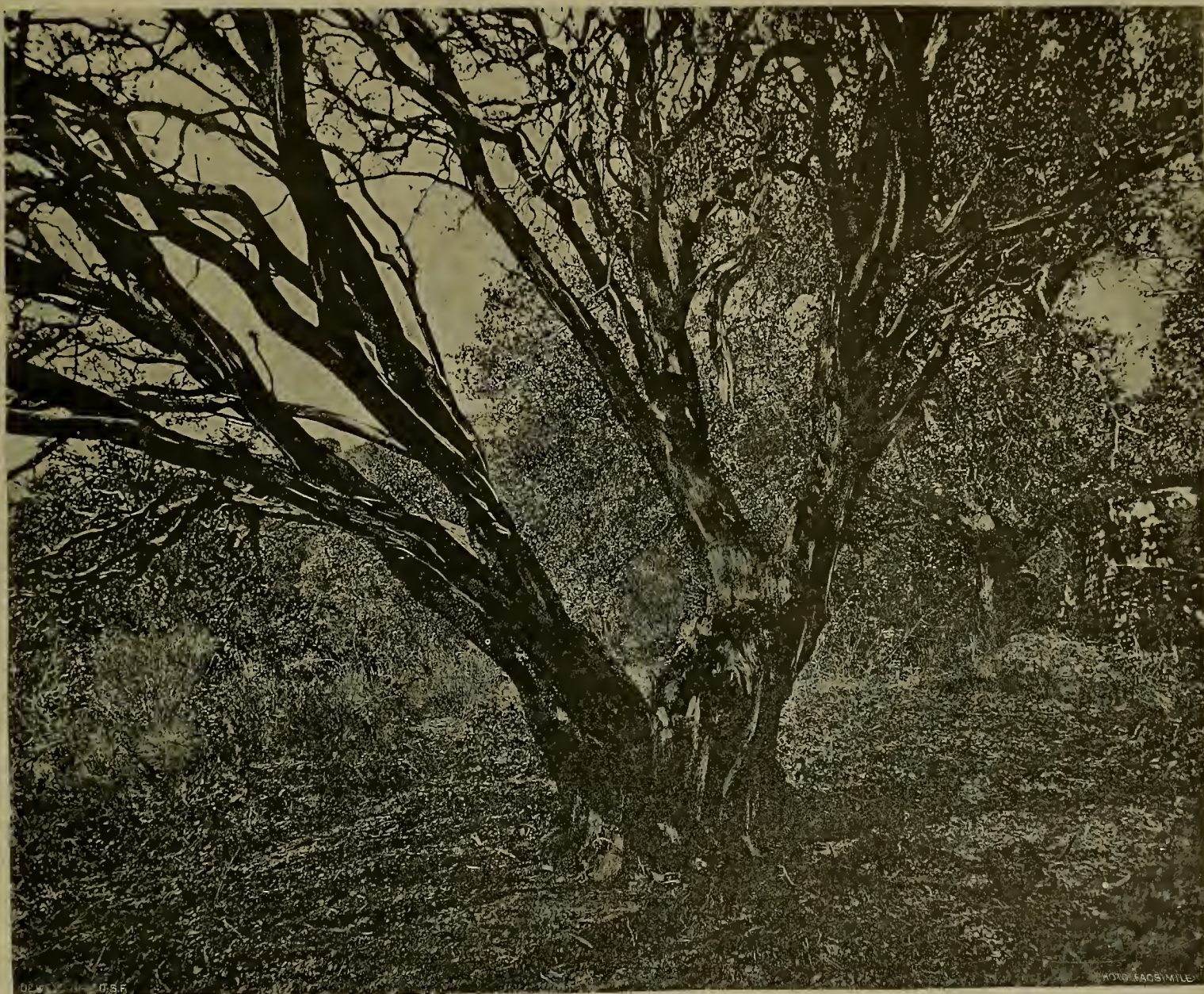
(Written for the PRESS by J. J. RIVERS, University of California.)

The *manzanitas* form a pleasing and distinctive feature in the natural forest flora of California. There are nearly 20 described species suited to various altitudes and conditions. They flower at different seasons, but always add beauty to the locality that bears them by the tone of their shining bark of rich Turkey red and cinnamon brown that give so much warmth to the slopes and hills in many districts.

There are three species of *manzanita* that grow to the stature of small trees, viz.: *Arctostaphylos viscida* that reaches a height of 15 feet; *A. Manzanita* and *A. Glauca* that attain respectively a height of 25 feet and 6 to 7 feet in circumference. The specimen of *A. Manzanita* illustrated in the photo-plate on this page is of far greater dimensions in every particular. The circumference at the base measures 11 feet

that are diverse in habit. Consider the great *Arbutus menziesii*, a madrone which grows to the height of 100 feet, and from 20 to 25 feet in circumference, and then consider the beautiful scarlet snow plant of the Sierras, *Sarcodes sanguinea*; then those of culinary worth, the cranberry, the bilberry and the bear-berry, and the useful wintergreen; then come some for beauty and cultivation—those grand pot-plants the heaths of the African Cape and the Scotchman's heather, and from our Southern States the fine kalmia, and for California add the azalea and rhododendron, and one can form an idea of the wonderful variety in form and character which pertain to the order which includes the grand *manzanita* shown in the engraving.

OPENING A LUMBER RAILROAD.—The Towle Lumber Company is preparing to resume operations for the season, and a force of men are now opening and repairing the railroad from Towle's Station to the top of the ridge in the vicinity of Omega in this county. In clearing the road



ARCTOSTAPHYLOS MANZANITA (Parry): GROWING ON THE ESTATE OF TIBURCIO PARROTT, ST. HELENA, CAL.

owner or stair-builder, whose men shall leave for the above-named reason, shall give the secretary of this association the names of the men so leaving, and the secretary is hereby instructed to furnish the same to each member of this association.

The directors of the Lower California Land & Fiber Company, which owns large tracts of land on the peninsula about San Borja Mission, some 350 miles below San Diego, have re-organized their company and elected their former bookkeeper, Dr. C. Webb, of Manchester, England, as manager. He has ordered in San Francisco one of the new Van Buren machines for separating the fiber, and will begin work as soon as the machinery is ready. The maguay plant grows wild all over that region and is of as good a commercial value for manufacturing brushes, rope and sacks as the fiber which has brought wealth to Yucatan for over sixty years, and also to the Bahamas. In those sections it is called "hengnan." The growth of the industry in Florida, where this new separator is being successfully used, encourages the Land & Fiber Company to begin active developments after a half-dozen years of unimportant experiment. The doctor explained that heretofore all

of beets. The factory was to be a duplicate of the Watsonville mill, and one of the many mills which the Occidental Sugar Co. (in which the Spreckels hold a controlling interest) propose to erect in different parts of the State. The strike in France and Germany delayed the machinery, and now it comes too late for this season. Owing to the unsettled state of sugar matters and the action of Congress, it is doubtful if it would have been set up had it reached here in time. The machinery will be stored until the fate of the Tariff bill is determined. The Spreckels say that with free sugar and the bounty systems of Europe they will have to close their mills. Beet-seed has been in so great demand in this State that there is now no more to be distributed. It can be had in small quantities at 30 cents a pound. There are 2500 acres in beets near Watsonville this year. If the crop is as good as last year, there should be 35,000 tons of beets for the crusher.

It is proposed to build a large water-storage dam on Lynx creek, eight miles east of Prescott, A. T., for hydraulic mining and for irrigation purposes, at a cost of \$250,000.

6 inches; at 2½ feet above the base it yields a measurement of 11 feet 8 inches. Above this point the tree bifurcates each division, giving a circumference of 7 feet 5 inches; at two feet higher more forks occur where circumferences are plentiful that record 3 feet 9 inches, 3 feet 10 inches, 4 feet, 4 feet 6 inches, 4 feet 7 inches. The general height of the tree is 30 to 35 feet and the spread of the head is 36 by 30 feet.

This remarkable *manzanita* has a very proportionate growth—a habit not characteristic of the genus. It is growing on the estate of Tiburcio Parrott, St. Helena, Napa county. It is in deep, rich soil and in the vicinity of a spring. These facts suggest that it is not axiomatic to say that where *manzanitas* grow, the land is poor; but where large *manzanitas* grow the land is rich, and where small ones grow the land is poor; and this equally applies to many other trees. If, added to good land, the laws of forestry were applied to the trees, to induce the growth of longer lengths of timber, a rich and valuable wood would be added to the cabinet-maker's stock.

The *manzanitas*, belonging as they do to the order *Ericaceae*, have some very peculiar allies. California yields two very diverse congeners

last week the snow was found to be nine feet deep on the ridge between Towle's Station and Bear valley, but in the valley the snow is not very deep. In the Steep Hollow region the snow is yet quite deep. The company has a sawmill in Bear valley and one at Steep Hollow, at which sawing will be done the present season. This year the Bear valley mill will about use up the available timber owned by the company in that locality, but there are years of work for the mill at Steep Hollow, to be supplied from the timber in that vicinity and on the Omega ridge. Besides this source of supply, the company owns an extensive body of timber laid on the north side of the Yuba river, which will be made available in a few years. As soon as the railroad is cleared of snow the mills will be started up, but it will be from two to three weeks yet before men and teams can go into the woods to commence the work of cutting and hauling logs.—*Grass Valley Union*.

The hoisting-house, blacksmith shop, dry-house and office of the Hartley Mining Company, in Grass Valley district, were burned to the ground Saturday night.

MINING SUMMARY.

The following is mostly condensed from journals published to the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

THE GARDNER MINE.—*Dispatch*, May 24: Mr. Robert Stevens, one of the owners of the Gardner mine, states that it is the intention of the company to build a good mill on the mine right away. In fact lumber is already being hauled up for the purpose of putting up the necessary buildings to be used by the workmen while engaged in building the mill. We also understand that the company contemplate purchasing the McKenzie mine and other properties in that vicinity, all of which will hereafter be known as the Clinton Con. mine.

PLYMOUTH CON.—*Ledger*, May 24: Forty stamps of the Pacific mill are kept running steadily. Some 70 men are at work, and more are being employed almost daily.

NEW LONDON.—This mine continues to do well under the able management of Humphrey Reese. It gives employment to 80 men, and the mill of 40 stamps is kept moving to its full capacity. The prospects of Plymouth have materially improved with the revival of mining interests. The Reeves mine, we are told, is giving encouraging results, and good ore has been discovered on Alpine ground, and each of these properties will help to impart new life to Plymouth.

AMADOR GOLD MINE.—At this mine they are getting things in shape as rapidly as possible for the starting up of the mill. The rock-breaker is in place, the ore-bin is full of rock, the track to the mill is getting in order for the conveyance of ore, and everything betokens that the long-looked-for and much-deferred dropping of the stamps is close at hand.

MCKENZIE.—The Huntington roller-mill has been shut down, probably for keeps. The McKenzie brothers have gone to San Francisco for the express purpose of making arrangements for building a ten-stamp mill.

SUTTER CREEK.—The mines are running along in the usual way. Mr. Stewart has let a contract to sink a shaft some depth, the object being to strike the ledge at a lower level, which it is expected will develop the mine into a still better-paying property. The development of other mines in this vicinity, which has been in contemplation for some time, is expected to be started in the near future.

Calaveras.

BIG FIND.—*Prospect*, May 24: It is told that a find has been started on Wheats Ranch after a depth of eight feet was attained, which is the most wonderful affair of the kind ever known in this county. Mr. J. D. Cook brought into Assessor Luddy's office the other day a specimen of the ore from the discovery, and Mr. Luddy says it is the finest specimen he ever saw. At a later day we will give a detailed account of the mine.

BIG CLEANUP.—*Calaveras Chronicle*, May 24: We are informed that the Louie Star mine, after a two-weeks' run, yielded over 114 ounces. The future prospects of the mine are exceedingly flattering. It has a ten-foot ledge which, to all appearances, will furnish pay ore for years to come.

El Dorado.

GEORGETOWN.—*Gazette*, May 24: Idle men are scarce just now about this camp. As the season progresses the demand for laborers increases. The building of the new school-house and other buildings, in addition to the contemplated extensive improvements on the property of the California Water Co., will make lively times here this summer. Extensive mining operations are also in a fair way of being started up.

TUNNEL.—Work on the new tunnel on the Josephine mine at Volcanoville is progressing under Supt. L. Evans with favorable results. The new, or No. 5 tunnel, is now in 400 feet, running on the vein 1000 feet deeper than the deepest workings of the mine. At present they have two veins, one three feet in width on west side, and the other four feet thick on east side of tunnel, within a few feet of each other. Mr. Evans brought down samples of the quartz on Tuesday, which he sent to S. F. The ore from the east vein appears rich in silver as well as gold. The west vein shows well in free gold. The Josephine lode will be tapped at a depth of 1600 feet by this tunnel, and the best chute which paid so well above, has not yet been reached. Several promising quartz prospects in this vicinity are receiving the attention of parties in search of milling propositions. Al. E. Brass and Robt. Mohbert of the North Star gravel mine near Volcanoville, were in town this week. This mine adjoins the Flora mine. The boys have completed a 400-foot tunnel, the face of which is some 500 feet below the surface. They are now raising up for the bed of the ancient channel.

Inyo.

NEW BORAX DISCOVERY.—*Index*, May 24: Messrs. W. T. Grant and A. W. Nobles came from Salt Wells Valley, last week bringing with them samples of almost pure borax in the form of "cotton balls." The new discovery is over the ridge from Searles marsh and within a few miles of the Carson & Colorado railroad survey on the line of the proposed extension to Mohave. The find promises to prove valuable. The gentlemen named, together with Surveyor Seeley and Mr. Young, a borax expert, have returned to the scene of the new discovery.

Mariposa.

BEAR VALLEY MINES.—*Mariposa News*, May 24: The mining operations which have been carried on for the past two years under the management of the Mariposa Commercial and Mining Co. have been casually designated as "prospecting." The operations at the Pine Tree and Josephine mine near Bear Valley, show an amount of work performed which will surprise any one who may have the time and opportunity of investigation. Work was commenced under the present management in November, 1887, at the mouth of the English Trail drift. This was originally run in 1083 feet. The present company cleaned out the tunnel and retimbered it where the caves had occurred, laid a T rail track, put in a new bulkhead at the Fremont shaft and dug new water drains the entire length of the tunnel. They used the Burleigh drill worked by air compressor and had to run a pipe from the com-

pressor-room to the English trail drift, a distance of two miles. They carried 65 pounds pressure at the mill and had sufficient power at the mine to run three drills and the blacksmith forge, besides furnishing the necessary ventilation. After reaching the terminal point of the old drift, 1083 feet from the mouth, the tunnel was run 223 feet to the turntable, where it cuts the Josephine and Pine Tree. These two ledges come together about 60 feet north of this point. From the turntable above mentioned, this drift has been continued 400 feet south, making a total length of the main tunnel of 1706 feet, of which 623 feet has been cut by this company. At the turntable referred to a drift was started north on the Pine Tree ledge and continued until the ledges separated and diverged, when it was further continued upon the footwall of the Josephine, a distance of 250 feet. The mine has been prospected by 9 crosscuts. The first shoot of ore which was developed under the present management was discovered at the turntable, 1306 feet south of the mouth of the main tunnel. It has been drifted on a distance of 223 feet. This ledge is very large and strong, averaging from 8 to 34 feet in width. The value of this ore on the footwall is estimated at \$8 per ton. The balance of the ledge will go about \$4. From the openings of these two shoots of ore there have been 1300 tons extracted and piled on the dump and about 500 tons stored in the mine. Altogether after a thorough exploration of the premises and from some little experience and personal observation of quartz mining, the conclusion is reached that the company has a veritable bonanza uncovered, that the Pine Tree and Josephine mines were never in as good shape for working, and that the prospecting has been done with good judgment and shows on the part of Superintendent Cross a practical knowledge of mines and methods of mining.

Shasta.

GOLD.—*Shasta Courier*, May 24: The striking of a new gold mine a mile or two north of town by Cunningham, Drummond & Co., and the taking out of about \$1000 in pure gold in a few days and at a depth of not to exceed 13 feet, is pretty good. The surface prospect which resulted in finding this lead was found directly in an old trail over which thousands of feet have traveled in years past. The fact is people about Shasta don't know how much gold there may be within a few feet of them.

ACTIVITY.—*Redding Free Press*, May 24: Activity in mining is in order with the advent of warm weather, and we hear of several important deals about to be made. It is rumored that in the Old Diggings district a sale is about to be consummated that will bring in more capital and fresh vitality. The mines of this district are all looking up and the owners are sanguine of a prosperous year. The Hart & Fleming mine continues very rich at greater depth, and at present shows a rich body of ore. Only six miles from Redding, in this district especially, are our hopes concentrated.

ON SQUAW CREEK the mines are looking well. The Sierra Buttes M. Co. is engaged in running a long tunnel several thousand feet, by which they expect to strike the ledge and a large body of ore 1100 feet from the surface, which in Shasta county is quite deep. This company is wealthy and all its operations are on an extensive scale and calculated to develop its property in a systematic manner. The Carson & Snyder mine owners recently made a cleanup of \$6000 on a short run with their mill, which is very encouraging. Work on the Croesus and Clipper is being prosecuted, and we expect at any time to hear of these small companies being gobbled up by some large syndicate of capital, which is only necessary to develop bonanzas. The Riley & Bliss mine will again start up inside of a week.

ON KLEIN GULCH, in the French Gulch district, a big deal is on the tapis. The Gladstone has developed a wonderful wall of paying ore and is considered excellent mining property by experimental mining men. There are also other locations adjoining that promise well, and as we said before, a deal is in hand to secure several of these mines under one management. The Snyder mine, an interest in which was not long since sold for something like \$5000, is now held at \$15,000 and considered cheap at that figure.

BOWLERS.—The boulders of Castle creek, some 12 miles from Castle Crags, the place where Hufface has recently started a store, and expects to build a town, have been turned to some use. When the report was first circulated that these boulders, lying on the surface of the ground, prospected rich in gold, people here thought it was a huge joke, but from reliable sources we have found it to be a fact. The ground is covered with huge boulders containing gold, and rich ledges are no doubt close by. Considerable attention is being directed to this camp, which, it is thought, will shortly develop into one of importance.

POCKET MINES.—The past winter has been fruitful for pocket hunters and those searching for seam diggings. The district directly west from Redding has been rich in these kinds of spots, and at the present time several parties are making a good thing out of pockets and seams recently discovered. This district has in the past been unfortunate so far as well-defined ledges are concerned, and the numerous reports of rich strikes that have not materialized have destroyed confidence, but of late there seems to have been made a better showing. The Gem and Hartman mines show large bodies of ore with indications of depth, and maybe the district will become as popular as in the old days of placer mining.

Siskiyou.

KNOW-NOTHING CREEK.—*Cor. Trinity Journal*, May 24: We have experienced an extremely severe winter in this section, resulting in much damage to improvements necessary for the operation of the mines. On Know-Nothing Creek the damages are partially repaired. On our property, which sustained considerable damage, everything has been restored to complete running order, thus enabling us to work our mine to great advantage, and also to resume operations with our mill, which were suspended all winter and early spring from the results of deep snows, snowslides and landslides. We commenced running our mill on April 30th. I will make a few remarks on the mining outlook of the Salmon river in general. The indications for the ensuing season of quartz mining are very favorable, and a handsome output of bullion this coming season is quite assured. Among the more important mills in operation on the Salmon are the world-renowned Black Bear, owned by

Hon. John Dagget, and the Gold Ball Mining Co.'s mill. From authentic reports the outlook in the mines that furnish the ore for these mills is very promising. Hydraulic mining on the Salmon is a considerable industry, furnishing employment to quite a number of people. The output of bullion from these mines with an assured long season of water, supplied by the deep deposits of snow, is anticipated to be very handsome.

ORO FINO.—*Cor. Yreka Union*, May 24: Among other places of interest we visited Oro Fino, where we found the mining in full blast. The Eastlick Bros. giant was throwing water against the bank of earth. We also visited the famous Wright & Fletcher mine, and found Mr. Wright and his assistant, Dock, just in the act of putting their ponderous giant to work on a mound of earth that is destined to pay away up in the thousands, judging from a prospect that we were shown by the obliging proprietor. We were then conducted by Mr. Wright to his elevator, and it is wonderful to see its workings. Boulders, debris and other refuse is forced by the pressure of water through an inclined pipe 30 or 40 feet long, and makes its confluence into a tail-race, which carries all the deposit away. Without controversy, these mines are the best in Northern California.

Trinity.

CANYON CREEK QUARTZ.—*Journal*, May 24: W. J. Grigsby gave us the following items concerning the Canyon Creek quartz mine: The Buck's Ranch mine, owned by Grigsby & Shock, has a ledge 14 feet wide from wall to wall, and with extensions has been uncovered on the surface for about 4000 feet. The ore carries free gold and but little sulphurets and is good milling rock; 40 tons run through the arastra paid satisfactorily for the method of crushing. The heavy winter prevented much development work; a tunnel has been run in about 100 feet, and two men have been put to work on an incline; open cuts have opened up the ledge along the surface. They are now working on the extension and will begin crushing 30 tons of ore from it, which is higher grade rock than the main ledge. They crush the rock by means of an arastra put up last fall, which Mr. Grigsby designed and is a decided improvement on the ordinary arastra. It is self-discharging and has a working capacity of 6 to 7 tons a day; it has crushed 7½ tons in 24 hours. It is far better than a mill for all prospecting purposes. Mr. Grigsby has applied for a patent on his invention. From the amount of work done on the mine, it is estimated that at least 1000 tons of free-milling ore are in sight. Boyce & Eligh have four locations in this vicinity; one of the ledges runs parallel to the Buck's Ranch ledge. A little work in the shape of open cuts has been done and the ledges show up well. Dedrick & Carson have three locations near by which they are working; they have good prospects. The group of mines owned by Smith, Bailey & Flowers is about 1½ miles north and higher up the mountain. A good deal of work will be done on these mines this summer; the work already done has disclosed a fine property and it is confidently predicted that this group of mines will prove a veritable bonanza. The Canyon Creek mines are on the East Fork of Canyon creek, and are in a well-timbered country with water-power easily accessible, and can be worked cheaply. Mr. Grigsby is very sanguine of the future of the camp and confidently predicts large operations in the near future. The mines have made splendid showing for the brief period since their discovery, and if a good location for gold-bearing rock and the general formation of the country is any criterion, a few years will see Canyon Creek one of the best bullion-producing camps on the coast.

Tuolumne.

BLACK OAK.—*Tuolumne Independent*, May 24: If there has been any fault in the management of this mine, we do not know of the fact or as to its nature. The Black Oak mine, under the present and efficient management of Supt. Scott, we are informed, is in a better condition to-day than it has been for years. When Mr. Scott took hold of the property it was laboring under heavy indebtedness, presumed to have been incurred in its development; and now, after doing all that could possibly be done, Supt. Scott is beginning to realize the benefit of his time and trouble, and the future of the Black Oak mine is golden.

NEVADA.

Washoe District.

SIRRA NEVADA.—*Virginia Chronicle*, May 24: On the 631 level a southwest drift is advanced 651 feet from the shaft station. Formation clay and porphyry carrying water.

UNION CON.—On the 1465 level from the north lateral drift, opposite west crosscut No. 4, east crosscut No. 1 is advanced 414 feet and is in soft porphyry now showing some water.

MEXICAN.—On the 1465 level at a point 70 feet south from west crosscut No. 4, west crosscut No. 5 is advanced 45 feet in porphyry carrying quartz showing value.

OPHIR.—On the 1300 level in working southwesterly from the top of the raise carried up 28 feet above the south drift from the end of the east crosscut from the shaft station, following the ore streak found in the raise downward, 24 tons of ore were extracted and raised to the surface, the average assay value of which is \$25 per ton.

CON. CALIFORNIA & VIRGINIA.—The 1300 and 1500 levels continue to yield the usual quantity of ore. Shipped to the Morgan mill 1104 tons and 270 pounds of ore and to the Eureka 1313 tons and 1170 pounds; battery sample assays showing an average value of \$22.50 per ton; 2549 tons milled. Bullion valued at \$43,641.30 shipped to the Carson mint, and about \$13,000 on hand in local assay office.

NORTHWESTERN CON.—Continue sinking shaft below the 100 level.

ANDES.—A 420-level west crosscut, 160 feet north of the shaft, is in 30 feet, continuing in clay and quartz seams in the face. The 350 level west crosscut is extended 235 feet, the face still in porphyry.

SAVAGE.—Shipped 510 tons of ore, showing an average value of \$21 by battery sample assays.

HALE & NORCROSS.—Shipped 1120 tons of ore during the week, showing an average value of \$18.75 per ton by battery sample assays.

POTOSI.—On the 850 level east crosscut No. 4, 400 feet south of the north line, is in 130 feet, the face in porphyry. On the 930 level the winze is down 130 feet, the last 10 feet showing marked improve-

ment. The bottom is mostly in quartz giving fair assays. The raise above that level has connected with the 850 level, improving the circulation of air.

WARD COMBINATION SHAFT.—The 1800 level east drift is out 380 feet; the face continues in porphyry.

CHOLLAR.—Extracted 478 tons of ore, battery sample assays showing a value of \$23.83 per ton.

ALPHA.—The 600 level east crosscut is in 140 feet, the face in porphyry and quartz. The 600 level west crosscut is in 140 feet, the face in quartz.

EXCHEQUER.—The 500 level north line east crosscut is in 191 feet, and continues in quartz and porphyry.

CON. NEW YORK.—The 960 level north drift is out 225 feet, the face in low-grade quartz. The north drift from the top of the raise above the 800 level is out 22 feet, the face in low-grade quartz.

SILVER HILL.—The east drift from the winze below the 800 level is out 60 feet, the face showing bunches of fair-grade quartz.

SCORPION.—The southwest drift from the 630 level shaft station is advanced 591 feet and continues in porphyry.

IMPERIAL.—The 750 level west crosscut No. 3 is in 124 feet, the face in low-grade quartz.

YELLOW JACKET.—Shipped 540 tons of ore showing average assay value of \$21.50 by battery sample assays.

CROWN POINT.—Shipped during the week 855 tons of ore, showing an average value of \$20.52 per ton by p.p. assays. A west drift from the 400 level raise is out 41 feet.

CONFIDENCE AND CHALLENGE.—The joint Imperial 1000 level west crosscut No. 1 is in 240 feet, the face in vein matter and the bottom in ore. The joint Imperial raise above the 700 level north drift is in low-grade quartz. West crosscut No. 2, same level, is in 103 feet, the face in low-grade quartz.

BELCHER.—The 200 level west crosscut is in 23 feet, the face in low-grade quartz. The 300 level west crosscut is in 224 feet, the face in porphyry. The 850 level joint east crosscut is out 458 feet, the face still in soft porphyry. A 290 level west crosscut No. 3 is being advanced to cut the continuation of the Crown Point 300 level stop.

SEG. BELCHER.—The 800 level west crosscut is in 22 feet, the face in porphyry and quartz.

JUSTICE.—During the week crushed 216 tons of ore showing a value of \$22.50 per ton by battery sample assays. The raise above the 622 level is in low-grade quartz. The bottom of the winze below this level is in good ore.

ALTA.—The ore output this week was 325 tons, showing an average assay value of \$22.50 per ton by pulp assays.

OVERMAN.—Shipped 220 tons of ore during the week showing an average value of \$23 per ton by battery sample assays. The northwest drift continues in low-grade quartz.

UTAH.—On the 725 level, west drift is advanced 252 feet from the shaft. At a point 225 feet west of the shaft a south drift is advanced 37 feet, the face in vein porphyry with streaks of quartz.

OCCIDENTAL CON.—Continue to extract ore of good quality from the slopes on the 400 and 450 levels. The 650 level main north drift is extended 96 feet through low-grade quartz.

NORTH OCCIDENTAL.—Work confined to repairs.

BEST & BELCHER.—On the 1000 level the joint west crosscut is cleaned out and repaired 300 feet. On the 1200 level the north drift is cleaned out and repaired 113 feet.

GOULD & CURRY.—On the 400 level the north-west drift from west crosscut No. 1 is extended 70 feet. Formation, hard porphyry with small streaks of quartz.

Dun Glen District.

BEING WORKED.—*Silver State*, May 24: The Hendra mill at Dun Glen is being worked to its full capacity. Sam Hendra has several men at work in the mine, which is producing high grade gold-bearing quartz, and the prospects of the camp are bright.

Eureka District.

ORE SHIPMENTS.—*Sentinel*, May 24: Sixty cars of ore pulled out of the E. & P. railroad depot during the week. The Eureka Con. Mining Co. received during the same period from the mines of the district: From the Dunderberg mine, 55½ tons; the Helena Mortimer, 60 tons; Banner, 12 tons; Kentuck, 1½ tons, and from the Reveille district 4 tons.

A DEVELOPMENT.—We learn that Joe D. Jou has made a good development in his Whippoorwill mine. Assays of the ore go satisfactorily high. All of the evidences point to large bodies of ore in that section of Prospect mountain. The Whippoorwill adjoins the Diamond on the south.

Sylvania District.

PROGRESSING.—*Inyo Index*, May 24: Andy Fife, superintendent of the Sylvania Mining Co. at Sylvania City, arrived here last Saturday, and reports everything progressing finely. Boarding-house and furnace building are nearly completed. They have 500 tons of ore out and over 3000 tons in sight. All the men who were at work in the mine were taken out and put to work in building the works to get ready to start up. The machinery and water-jacket furnace are expected to arrive on Monday, and will be shipped to the mine immediately. There is a great deal of freight going out to Sylvania daily; all the teams in this section are busy and everything looks encouraging that Big Pine and Owens Valley are going to have quite a boom. The mines are in E. meralda county, Nevada, but all the Co.'s works will be put up in Inyo county, California.

Tuscarora District.

TO RESUME.—*Times-Review*, May 21: G. W. Grayson and P. C. Hymn left this forenoon by private conveyance for Carlin, en route for San Francisco. They stated before they left that active operations will be resumed at all of the mines under the directorship of which they are members, as soon as timbers and supplies can be obtained. It will probably be about a month before everything will be in full blast, after which time we shall be greatly disappointed if Tuscarora does not make such showing in the matter of bullion production as will rival that of any district of its size on the coast.

ARIZONA.

PEER.—*Alta*, May 26: The north drift from the bottom of shaft No. 2 has been advanced 5 feet, making 12½ feet in all, with face culminating in ore of good quality. The south drift from the bot-

tom of the same shaft is out 9 feet, with the vein strong and showing ore of good grade.

PEERLESS.—On the 340-foot level, winze No. 1 has been extended 15 feet, making 41 feet in all, without any change since last report, the vein showing strong and of fair grade.

CROCKER.—On the west side, tunnel No. 2 has been advanced 19 feet, making 189 feet in all. According to the survey, 60 feet more will connect with the 440-foot level, when further prospecting of ore at this point will be resumed.

WELDON.—In shaft No. 1 the formation is getting softer, and shows considerable iron and copper stains on the west side of the bottom. Better progress is being made.

NOTES.—Prescott *Courier*, May 23: Chamberlain & Charmickle have repaired the Lowell mill, Walker district, and are again running it as of yore in a profitable way. Robert Dougherty and Aleck Harris have come in from the Bradshaws and state that mills and mines are paying. Thirteen tons of silver ore, just shipped from the Blue Dick mine, Hassayampa district, sampled about \$250 a ton. The big gold mine between People's Valley and the Congress has just been bonded to three gentlemen—two Californians and a Coloradoan. One of the owners, Mr. Yarnell, has contracted to run a 200-foot tunnel. He will employ four miners. The vein is large, and gold to the amount of \$18 or \$20 a ton is scattered all through the rock. More teams, with concentrates from the Congress, reached Prescott yesterday. Mr. W. T. Rowe, who owns a big silver mine in Peck district, is here and says he has a great many tons of milling ore on the dump. P. A. Craigie will shortly ship rich ore from his Doris. Wm. Van Name is building another mill in Big Bug district, and a great many men are taking out ore. United Verde mines and smelters are sending out over a carload of matte, etc., each day. Another large shipment of high-grade silver ore was sent off last week by miners of Tip Top district. Quartz Mountain Co. are rearranging their mill and shipping some of their richest ore. Mr. O. F. Place of the Crowned King arrived yesterday from his paying camp. Arizona is indebted to him for the development of at least one good gold vein, which is now producing plenty of gold. Mr. Carlisle, superintendent of the Black Horse mine, is sending in ore which contains abundance of wire gold and native silver. More Congress sulphurets were hauled in yesterday. Mr. Henderson says times are good in Old Walker district.

COLORADO.

SILVER IN THE DEEP SHAFT.—*Aspen Times*, May 24: The Deep shaft that is being sunk by the Deep Mining and Drainage Co. upon the Home-stake claim has passed through the porphyry and is now in the shale. A rather peculiar development has taken place, in that native silver has been found in this shale, this being the first discovery of the kind that is recorded in this district. It is very common to meet with streaks of lead in this formation, but heretofore, silver, except in small quantities, has not been found in it. It is not at all probable that any value is attached to the discovery, but the fact that the silver appears in the native form is highly interesting and has created much comment.

THE LITTLE RULE.—Late reports from the Little Rule are to the effect that the recently discovered ore is still improving. The management expects to begin shipments from the property during the present week.

THE SCHILLER.—Several months ago the management of this property started an incline from a point 600 feet down the shaft, southeasterly, in order to cut the formation squarely and reach the contact with the least possible amount of work. The company operating the Schiller has been putting money into that ground for six years, and has at last obtained such great depth that it is not improbable that ore may be struck at any time.

THE BURRO.—Since the lessees of the Edison mine opened up the rich body of ore that lies along the line that separates that property from the Good Thunder, surveys have been made by the lessees of the Burro which show that it will be necessary to sink that shaft fully 60 feet deeper before the ore-chute can be reached.

DAKOTA.

A BIG TWELVE-HOUR RUN.—*Deadwood Pioneer*, May 24: Six thousand one hundred and thirty pounds of bullion, of silver and lead mixture, from the Iron Hill mill, were stacked up in front of the First National bank yesterday morning, and viewed by the hundreds of visitors who passed by. This represents a 12-hour run. As soon as a carload is turned out the bullion will be shipped to Omaha to be worked out.

FLOAT.—Bald and Elk mountains are putting on a scene of general activity. An attaché of the *Pioneer* made a hasty visit to their camps yesterday. Ore was being piled up on every dump; the busy notes of preparation were discernible everywhere. The old-timers who have held on to their properties for years will soon realize on their ores.

IDAHO.

GOLD UNDER THE CEMENT.—*World*, May 24: Kimball, Rudge & Sandlin, at the junction of Middle and North Boise, have struck rich placer ground underneath the false bedrock. The dirt yields from 25 to 50 cents to the pan. The sedimentary formation is only three or four feet thick; still the fact is proven that on those streams the first wash carried down the most gold. The theory of most of the miners here is that the richest ground in More and Elk creeks is below the sedimentary formation, having come in with the first wash. Whether or not such is the fact can only be proven by a shaft, which would have to be sunk to great depth. In 1870 one was sunk to the depth of 128 feet at the junction of the two creeks, but the water came in so rapidly that a 10-horse power engine was unable to keep it out, and the work was necessarily abandoned. To put down a shaft with certainty of proving whether the lower stratum of gravel is good it will be necessary to put in pumps capable of throwing a large volume of water. This will require considerable capital, yet it would be better to spend more money and be certain of reaching the granite bedrock. Some day this work will be done, and with

good chances of opening up rich placer ground. One favorable indication here is that where the granite dips under the cement, gold lays on it as far as has ever been prospected.

THE GOLDEN BELT. A prospect on Middle Fork of Henry creek, owned by Harry Friend and Gus Schlosser, is under course of development. Last fall the surface was uncovered for a few feet, and rich gold ore obtained, but, as the ledge from which it was taken was on low ground and filled with water, it was impossible to develop it by sinking, so a tunnel is driving for the vein which will tap it at a depth of 60 feet.

LOWER CALIFORNIA.

ALAMO.—*Lower Californian*, May 23: The Princessa company is working 17 mines, employing, including tributaries, about 120 men. Their mill is kept busy night and day on first-class ore, and tons and tons of fair ore are on the dumps ready to be milled. The Telemaco is down 65 feet, the shaft being on a 75-degree incline. Hoisting works are just getting into place and a 50-horse power engine is on the ground. The Telemaco will average 3½ feet wide. Mr. Argall is foreman. Supt. Rodda believes the best mine of the Princessa company is the Ulysses, which is 600 meters long and 200 wide. Three distinct mines exist within this ground, besides the main vein. All are quite well developed, enough, at least, to prove them independent veins. They are from 1½ to 3 feet wide and very rich. The main vein is 3 feet wide. The Indian mine is now waiting for its big pump. It has hoisting works designed by Supt. Rodda which are the best here. The Princessa, under Foreman Hoskins, is going ahead steadily and is down over 100 feet. The Penelope is developing into a splendid property. Prospects of yellow ore containing oxide of lead from the bottom of the shaft went \$200 per ton. A large amount of ore containing sulphurets and pronounced rebellious was run through Lane's mill by Supt. Rodda and found to be free-milling \$200-ore. By concentrating the ore will run \$30. A strike was made in the San David by tributaries the other day and their claim was cheaply bought by the superintendent. Night and day shifts are at work on it. W. E. Howard, three-fourths owner of the Montezuma, was in camp the past week arranging to develop his mine. J. M. Albright is the other partner. The mine is right across the road from the San David and the strike in the latter points to favorable work on the Montezuma. Several Mexicans who have been at work as tributaries for the Princessa company run their ore through Lane's mill this week, netting 93 ounces. The brick was sent down on Monday's stage. The El Paso company made a cleanup last Sunday.

MONTANA.

THE BOULDER BASIN MINE.—*Anaconda Review*, May 22: All the mines in Boulder Basin are showing up in fine shape. H. W. Currin, on the Pilot, has a fortune in sight of high-grade carbonates ore. At the Mono, their new hoist is in position and two full shifts are pushing development. The Bismark and VonArmin are both yielding their usual amount of rich ore. George Spencer's new strike has almost two feet of solid high-grade galena in the bottom of the shaft.

NEW MEXICO.

DEVELOPMENTS.—*Silver City Enterprise*, May 24: C. M. Jay passed through the city this week with a car of high-grade ore for Socorro. Martin Cox and Geo. Dickinson are about to start work on the Silver Bar mine, at Bald mountain. They have some very rich silver ore in sight. Bell and Brown have made a test run on ore from the Tampico. The returns were quite satisfactory. The mill is being put in readiness for a long run. N. Bell has returned from Carlisle, where he purchased six Frue vanners, which will be added to the Bell & Stephens and the Smith & Ailman mills. The Aztec M. Co. is going to make a test of concentration of its low-grade ore by Frue vanners after amalgamation. The test run will be made at the Atlantic Gold Co.'s mill. Bell & Stephens have purchased a lot of machinery from the Carlisle M. Co., which will be placed in the Smith & Ailman mill at Pinos Altos. The mill will be started on ore from their claim on the Pacific vein as soon as the machinery is in place.

MOGOLLON.—The camp is still flourishing and new strikes are reported every day. New discoveries of rich ore chutes on the Queen lode are of frequent occurrence. Mader and Buhlman are taking out fine ore on the Denver location on the south side of Mineral creek. John Frye and C. Lyons have struck a little bonanza on the north side of Mineral creek. George Doyle and W. S. George have two very promising locations on the Queen lode on Copper creek. It is currently reported that Capt. Frank Vingo and Edward Phoenix will go to St. Louis within a few days to purchase a milling plant for the Little Fannie. The Confidence still holds its own; the working force on the mine has been increased. Frank Baxter is working the Ann Arbor and taking out very fine ore. Worden & Co. are working the California. They have sacked a small lot of high-grade ore and more is being taken out to make a shipment to the smelter.

UTAH.

THE GOVERNOR.—*Eureka Chief*, May 24: A reporter inspected the Governor mine, east of Dragon, Tuesday, in company with H. F. Gear and Jack Mogan. The shaft is down 77 feet, 30 of which is sunk in ore. They are now running a drift, and will soon commence stopping. The ore body grows larger as depth is attained, and there is no knowing how big it is or how far down it extends, but there is no doubt that there is an immense body of ore and every indication points to a big mine. They have over a car of ore on the dump and will begin shipping next week. The ore is rich, carrying heavy in copper, and some of it going as high as 50 ounces in gold. The Governor is owned by Judge Dana and Ben Bochman, and is leased and bonded to H. F. Gear, J. H. McChrystal, Hansie Oie and George Cline. They have set up an assay office and are running two shifts. There is no doubt that they have a bonanza.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING MAY 20, 1890.

- 428,159.—VEIL FASTENER—Adams & Tryon, S. F.
428,074.—GRASS RECEPTACLE FOR LAWN MOWERS—C. Buchmiller, Pasadena, Cal.
428,392.—HARROW—J. H. Hanson, Oakland, Cal.
428,251.—APPARATUS FOR REDUCING BITUMINOUS ROCK—J. B. Jardine, S. F.
428,174.—TELEPHONE—J. C. Ludwig, S. F.
428,117.—HORSESHOE—E. & T. Maloney, S. F.
428,283.—WAVE MOTOR—T. C. Naramore, Los Angeles, Cal.
428,177.—SOFA BED—Newhouse & Hansen, Modesto, Cal.
428,350.—WAGON JACK—Oliver & Wren, Oakland, Cal.
428,524.—HAMMER HANDLE—M. E. Reilly, Montezuma, Wash.
428,531.—SINGLETREE HOOK—A. Scott, Uniontown, Wash.

The following brief list by telegraph, for May 27, will appear more complete on receipt of mail advices:

California—Peter Abrahamson, S. F., window ventilator; Richard B. Avery and R. F. Smith, San Diego, hydrocarbon burner; Hans P. Christensen, assignor to himself and J. Hansen, Oakland, hydraulic motor; Frank A. Fox, S. F., car-coupling; Louis Glass and W. S. Arnold, assignors to R. W. Smith, S. F., two patents for coin actuating attachments for phonographs; George T. Hall, Monrovia, Cal.; Frank J. Johnson, Sacramento, Cal.; Joseph P. Kelly, S. F., railway rail joint; Stephen Wren, Sacramento, spike-making mechanism; Edward W. Williams, S. F., overflow sloop-hopper; Sterling P. and E. Windsor, Madison, spreader for draft chains.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

TELEPHONE.—John C. Ludwig, S. F., assignor of one-half to A. C. Pansell and Martin Corcoran of S. F., and T. C. O'Conan and H. T. Compton of Oakland. No. 428,174. Dated May 20, 1890. This is one of that class of telephones in which a diaphragm operates against the armature of a magnet to induce a current over the line-wire; and it consists essentially in a hollow sounding-frame or box to which a mouth-piece is attached, the back of said frame or box forming the diaphragm, which acts upon the armature of the magnet. The invention further consists in the combination, with a suitable diaphragm, of a particular arrangement of armature and magnet; and it consists also in the novel arrangement and combination of the hollow frame forming a sounding-box with a mouth-piece in its front, the back wall serving as a diaphragm, the magnet, the bobbin thereof, the armature of the magnet, and the arm of the armature resting against the back wall of the sounding-box. The object of the invention is to materially increase the efficiency of the telephone by increasing the loudness and distinctness of the sound transmitted.

APPARATUS FOR REDUCING BITUMINOUS ROCK.—Joseph B. Jardine, S. F. No. 428,251. Dated May 20, 1890. This invention relates to that class of devices for melting or softening bituminous rock, asphalt and other substances used for paving, roofing, etc., in which the material is confined in a kettle and is reduced by the action of steam. The patent covers a number of novel details of arrangement and construction of the kettle, making it simple and effective.

VEIL FASTENER.—Herbert W. Adams and Philo N. Tryon, S. F. No. 428,159. Dated May 20, 1890. This is a device for fastening and holding ladies' veils in place. It consists of two separate pieces formed of wire, and comprising parallel elastic wires for holding the ends of the veil and the enlarged openings for the introduction of the ends of the veil between said elastic wires, one of the pieces having a loop or eye and the other a hook for engagement therewith, this hook having a corrugated shank.

SOFA BED.—Ossey Newhouse, Modesto, and Lewis Hansen, Newman, Stanislaus Co. No. 428,177. Dated May 20, 1890. This invention relates to that class of furniture known as sofa-beds; and it consists in the novel improvement in the arm-rests of the sofa, whereby they are adapted to be converted readily into the head-board and foot-board of the bed, and the novel improvement in the means for enporting the back of the sofa when in an approximately upright position and also when in a horizontal position, forming part of the bed. The object of the invention is to provide a sofa-bed in which the entire length of the bed may be utilized without interference from the arm-rests or the head and foot boards, and in which the means for enporting the back or folding portion are simple and effective.

YOU BET.—The once almost depopulated town between here and German Level is daily improving, and it is now quite a lively camp. New families have been moving in, and business is good there. The prosperity is principally due to the working of the Brown mine by drift process.—*Nevada County Herald*.

Mining Share Market.

The mining share market continued active in the Comstock throughout the past week, with Potosi the leader, followed toward the close by an upward move in Bullion. The move in the latter is not in sympathy with Potosi, but it is based on work heretofore mentioned by us that is being done in Bullion ground. The rest of the market did not do much, for while Potosi and Bullion stocks moved up nearly 40 per cent since last Thursday, the other stocks advanced on an average only about 10 per cent. The manipulation has been of such a character as to clean commission brokers out of nearly all stocks held by their customers. The buying of so many stocks by the ring or pool necessarily means ore talk later on so as to sell out at higher prices, to collect assessments and make a few hundred thousand dollars for summer use. Not but that there is merit in the mines, and that under proper management they can be made to pay dividends, but to the ring there is more money in assessments, a three or four dollar stock deal and the milling of ore so as to get the bullion or huddle, than there is in dividends.

In outside stocks the Tuscaroras were more active, with North Commonwealth, Del Monte and one or two other stocks selling higher, while Commonwealth held heavy. In the Bodies there was nothing done. In the Quijotas business was light, with only few transactions in Crocker, Central, Peer and Peerless.

In the Alta group there has been and still is steady concentrating buying by a pool. The buying is based on important work going on in the mines.

From the mines, our Virginia City advices report continued improvement in Overman as prospecting work is pushed. A northwest drift has been started on the 300-foot level which promises well. It is being run toward Seg. Belcher. In Belcher, active prospecting work is under way on several levels, with three of the drifts or crosscuts in very interesting ground—some say in ore. Crown Point ought to do better now that the mill is not crushing ore, owing to high water, for more prospecting work can be done. The drift heretofore mentioned by us that is being run from the 850-foot level Ward shaft into Bullion to tap the ore found in Potosi, is being vigorously pushed. The crosscuts in Alpha and Con. Imperial are being pushed ahead. The west crosscut in Confidence is officially reported to be in vein material, while private advices report ore. The west crosscut in Challenge is being pushed ahead to tap the west ledge found in Confidence, Alpha and Con. Imperial. Interesting work is being done in Gould and Curry, Best and Belcher and two more of the North End mines. In Kentucky the hoisting winze has been connected with the 1000-foot level.

High water in the Carson river has caused the stoppage of the mill running on Crown Point ore and one of the mills running on Con. Virginia.

Over a year ago the MINING AND SCIENTIFIC PRESS took strong grounds that there was a well-defined mostly gold-bearing lode lying to the west of the Comstock lode, and now our position is being proven correct, as has every assertion we have made about ore developments been verified later on by official reports. W. E. Sharon and other mining men now affirm that the west crosscut run show that the body of ore run into on the 750-foot level in Confidence and Challenge dips to the west, and on the 1000-foot level the body of ore run into in the Confidence ground has the same dip. Experienced practical mining men unhesitatingly state that the present finds in the Gold Hill mines warrant the assertion that under proper management no more assessments need be levied by the Gold Hill mines, but in lieu thereof dividends be paid. The ore goes, so it is reported, from 65 to 80 per cent gold, and averages across the face of the lode from \$40 to \$60 a ton—some claim higher assays.

In Potosi it is said they intend to commence stopping out ore soon. Whether this means an assessment, like Hale and Norcross, later on, remains to be seen.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

GIANT FUEL MANUFACTURING CO., May 23. Capital stock, \$500,000. Directors—Frank Loftus, Chas. S. Preble, John H. Durst, James Madison and Frederick Eldridge.

GOLDEN WEST BUILDING AND LOAN ASS'N., May 23. Capital stock, \$3,000,000. Directors—S. W. Levy, Jacob Bicon, I. W. Goldman, Henry Jacobs, A. Willis Lighthouse, H. I. Barron, Gustave Brenner, Solomon Getz and Samuel Lewis.

CAPITAL BUILDING AND LOAN ASS'N. Capital stock, \$3,000,000. Directors—L. R. Ellert, F. Mandelbaum, Joseph Fiegel, Nathaniel Hunter, H. Shainwald, S. C. Buckbee, James K. Kennedy, F. C. Richards and Leon Greenberg.

PETALUMA FRUIT-PACKING CO., May 23. Capital stock, \$100,000. Directors—F. C. De Long, John Allen, Wm. Hill, A. B. Field and B. F. Stone.

WELLMAN, PECK & CO., May 24. Object, to conduct a wholesale grocery business. Capital stock, \$500,000. Directors—R. A. Wellman, A. K. Wellman, W. B. Wellman, W. J. Tilley, Frank Harold, William P. Harold and George R. Savage.

ZENGER WOOD RETORT AND MANUFACTURING CO., May 24. Capital stock, \$7,000,000. Directors—A. Zenger, H. E. Frost, J. B. Warren, M. J. Henley and John S. Kimball.

COSMO METAL CO., May 27. Object, to make, manufacture and vend composite metals, and to buy and sell all kinds of metals. Directors—C. A. Luckhardt, H. E. Trubenbach, S. E. Tucker, D. Crullins and Adolph Osterich.

Bullion Shipments.

We quote shipments since our last and shall be pleased to receive further reports:

Eureka Cons., May 25, \$27,000; Cons. California and Virginia, 22, \$13,106; total on May account, \$69,588. From Butte, Montana, week ending May 17, \$87,520; Hanauer, 23, \$3925; Salt Lake City, week ending May 22, \$194,250; Comstock mines, week ending May 24, \$116,276.

MECHANICAL PROGRESS.

Mechanical Improvements.

There seems to be, just at this time, quite a multiplicity of valuable inventions about coming into use. One of the holdest and most important is that for reducing iron and steel into practical forms for use direct from the furnace or converter.

Steel Tubes Directly from Molten Metal. The bold proposition of a Boston inventor, is about to be put into commercial shape in the city named. No details are given other than that experimental machines built have demonstrated the feasibility of rolling a tube directly from molten steel, iron, brass or other metal. The inventor also claims that he can make compound tubes in the same way by rolling one metal on another. There is a big fortune in the scheme if the thing can be done.

Seamless Steel Boats.

Metallic articles of small compass for household purposes, etc., have long been made by direct pressure and without seams. An English inventor, however, has greatly enlarged the sphere of this industry by devising a method whereby it may be applied to much larger articles than heretofore. Mr. William Heslop, formerly of the Leeds Forge, England, is applying hydraulic power to the manufacture of steel boats. This has been attempted before, but unsuccessfully. What is known by engineers as the "buckling" of the plate—that is, the crimping along the edge of the metal—produced in the flanging operation, was the great obstacle to be overcome. Mr. Heslop commenced experimenting in cold lead, and he found that to get rid of the "buckle" in one operation was an impossibility; but careful experiments proved that the difficulty was to be overcome by degrees—that is to say, by doing a certain portion of the flanging at first, then an additional portion by a second operation, and the remainder by a third. The advantages claimed for the invention are various. These seamless steel boats will be proof against the destructive influence of sun and shower, and be much more durable and reliable than wooden boats. Though made of steel, the weight will not be greater than that of a wooden boat of the same size, and the buoyancy will not consequently be less. The corrosion of steel, which can be prevented by painting, will not be a greater drawback than it is in the case of torpedo or other vessels made of the same material. It is contended that, in every respect, the seamless steel boat will be superior to the wooden one, and the cost of the one, it is stated, will not be materially greater than the other.

Copper Articles Directly from the Rough Metal.

It is now considered quite certain that the method recently patented by an Englishman of manufacturing copper articles direct from rough copper here, will achieve results for that metal equal in importance to what Bessemer's process has done for iron and steel. Briefly, copper is electrically deposited from the rough bars upon a revolving mandrel or mold, over the face of which a burnisher moves automatically, and so condenses the copper particles as they are deposited, the material being thus rendered not only dense, silky, fibrous and cohesive, but possessing an otherwise unobtainable strength, ductility and uniformity at a low cost. Among the advantages enumerated for the process is the important one that, in the manufacture of tubes and similar articles, all drawing down and brazing is entirely dispensed with. There is practically no limit to the diameter of seamless pipes and other articles that can be produced, which has not been the case heretofore. Many copper products, especially large tubes, vats, cylinders, and the like, can be made direct from rough copper far cheaper than by any other process. The electrical conductivity of the annealed copper is greater by four and a half per cent than that of the best commercial copper; and the copper can be varied in tensile strength and ductility according to the requirements. With all these points in its favor, it is also stated that the quality is first-class and the cost much reduced from that of the ordinary method.

Half a Century of Inventions.

Those of us not yet fifty years of age have probably lived in the most important and intellectually progressive period of human history. Within this half-century the following inventions and discoveries have either been placed before the world or elaborated: Ocean steamships, railways, street tramways, telegraph lines, ocean cables, telephone, phonograph; photography and a score of new methods of picture-making; aniline colors, kerosene oil, electric lights, steam fire engines, chemical fire-extinguishers; anesthetics and painless surgery; gun-cotton, nitro glycerine, dynamite and a host of other explosives; aluminum, magnesium, and other new metals; electro-plating, spectrum analysis and the spectroscope; audiophone, pneumatic tubes, electric motors, electric railways, electric bells, type-writers, cheap postal system, steam-heating, steam and hydraulic elevators, vestibule cars, cantilever bridges. These are only a few out of a multitude. All positive knowledge of the physical constitution of planetary and stellar worlds has also been attained within this period.

Iron in the Coming Census.

One of the most interesting features of the industrial department of the eleventh census, says the *Philadelphia Record*, will be the enumeration of the iron and steel making establishments of the country. Taking the nation as a whole, the iron and steel industries will probably show the most important advances that have been made in any American industry during the last decade.

The great strides that the iron and steel industries have taken since the last census have been not only in increased production but also in the introduction of new elements of industry, improved processes, and the amazing development of new producing territory.

The statistics of the iron and steel industries of the entire country are being gathered, under the direction of Dr. Wm. M. Sweet, who is establishing his headquarters at 261 South Fourth street, Philadelphia.

The iron and steel department of the division of manufactures embraces blast furnaces, rolling-mills and steel works—iron ore being a distinct branch of the division of mining. In laying out his work, Dr. Sweet has prepared schedules for each different branch of the iron and steel industries, grouping them in this manner: Blast furnaces, rolling-mills, Bessemer and open-hearth plants, crucible steel plants, and forges and bloomeries. In addition to separate schedules for each of these, there are several forms for preliminary information. The points covered by these schedules embrace all the details of production, such as character and cost of material and labor, and are calculated to bring out all the essential features of the business.

When all these returns shall have been received, analyzed and classified, they will show some very interesting information. One of the most significant features will be the position of the Southern States among the pig-iron producers. While the progress of the South has been known in a general way, the forthcoming census will set forth the facts in a more definite and detailed form. Alabama and Tennessee, which ranked tenth and thirteenth respectively among the pig-iron-producing States in the tenth census, will be shown in about the fourth and fifth places; while Pennsylvania and Ohio will still hold their relative rank as first and second. The total production of pig iron, as given in the last census at 3,781,021 net tons, will appear at more than double that amount. The American Iron and Steel Association's report for 1889, which will come very near the census figures, showed 8,517,068 net tons. The steel-rail output will show an increase of similar proportions.

Among other things that this branch of the census will show will be the remarkable extent to which steel has been substituted for iron during the past decade. This has resulted from improvement in the methods of steel-making and the consequent reduction in the cost of product. One point that will be brought out by the census which is not generally known, and which did not appear in the tenth census, is the existence of extensive facilities for the manufacture of heavy armor plates and for making heavy gun forgings.

Ten years ago this country was practically without such facilities, but now there are establishments in the United States that exceed any in the world in their capacity for steel forgings and heavy armor plates. Since the tenth census two new processes of making Bessemer steel have been introduced, and are now in use in this country. These are the Clapp-Griffiths and the Robert-Bessemer processes, both of which are modifications of the ordinary Bessemer processes. They are both of comparatively recent origin, and their use has not been extensive as yet. The basic process of making steel, which is largely in use in Germany, is just securing a foothold in this country, but its introduction has been retarded by the extended litigation over the patent rights.

CHEAP PLAN FOR MAKING CAR WHEELS.—The *Railroad Gazette*, in an account of the shops of the Northern Railroad of France, says they have a very economical plan of making wheels for cars by bending up seven pieces of bar iron in such a shape that the center fits inside of a band or false fellow, which, in turn, is hammered into a groove in the tire. Fellow and bar are riveted together and the bars bent round to the center of the wheel, and their ends then have a mold placed below and above them; cast iron is then run in, forming the hub, which is afterward bored out and the cast-steel axle forced in by 55,000 to 66,000 pounds hydraulic pressure. The life of the center of the wheel is said to be practically interminable under ordinary conditions, and the cheapness is such that they are now adopted almost entirely. However, in some cases wrought bands will be seen to have been shrunk on the hubs of some that have been cracked by wreck or other cause; but the greatest care is taken to reject any with end cracks or other defects.

SUBSTITUTION OF IRON AND STEEL FOR WOOD. Iron and steel are constantly coming more and more into use as a substitute for wood. This perhaps is more noticeable in France and England than it is in this country. Iron and steel are used, wherever practicable, in manufactured articles, such, for instance, as building materials, boxes and packing cases, barrels and casks, carriages, carts and other vehicles, furniture, fencing, railway work, sheds, signal-boxes, telegraph poles, etc.

SCIENTIFIC PROGRESS.

Instinct vs. Skill.

Mechanical skill does not seem to be altogether confined to the human family of animals. Many of the lower order of animals seem to possess quite as high a degree of mechanical skill as man. We call it instinct in the lower orders because it seems to be inborn with them; while in man it is an acquired knowledge and reached only by progressive degrees. The animal and the insect perform their first mechanical work without either model or instruction, and their first is as perfect as their last. They have no "accidents" in their communities. The relation between human reason and animal instinct is so nearly allied that the line of demarcation cannot be readily pointed out.

Who does not admire the skill of the bee in constructing her cells for honey?—nothing could be more mathematically correct. The same thing may be said of many other insects—especially of the various spiders, who provide beautifully delicate and safe homes for their families. The beaver also builds his dam and constructs his house with a wonderful degree of what we are constrained to call intelligence. Its mechanical principles are perfect. He could not build as he does without a cutting tool and trowel. His teeth provide the one and his tail the other. The nests of many varieties of birds display much apparent ingenuity and forethought in so constructing them as to guard their progeny from danger of various kinds. Many other similar references might be made.

We have in California what perhaps may be considered the chief of animal architects in the shape of a spider. His form and habits are anything but pleasant to consider, but his architectural skill is wonderful to contemplate. In the construction of his home he may well challenge the world, whether insect or animal. Being confined to tropical and semi-tropical regions, he must provide a retreat impervious to water. This he does by the use of a cement that becomes so firm and hard that water will not penetrate its walls. The cover to his little tenement is one of the marvels of instinct which approaches so near to reason that we can't appreciate the difference. It is a trap-door and on the top of his house. The opening must first be made and the door must be made to fit it. No casketmaker ever constructed a more nicely and closely fitting door, either large or small. It neither shrinks nor swells; it opens as easily as though it simply rested upon a plain surface. It has a hinge so constructed that it has no play, except in the proper direction for opening and closing. As we have remarked, the opening must have been first made, and with a smooth, beveled edge. The door must be made in a separate piece and is usually about half an inch in diameter, perfectly round, beveled in the opposite way from the opening, and about a sixteenth of an inch in thickness. This door must be made away from the opening which it is designed to close. How does the little mechanic contrive to make so perfect a fit? Does he rely solely upon his eye for the proper dimensions, or does he lift it up and put it in place, repeating that operation and moving it off again until he gets the exact fit? And then how does he fasten to the opposite walls that wonderful hinge, which never creaks, so elastic and yet so true in its motions? If the insect was a human, he would patent the device, and make his co-associates pay him tribute; but not so in spider commonwealth—everything there is common, in reality.

Did any one ever see this insect mechanic at his work? We imagine not; else we should have been told long since just how he wrought. He is a very shy being. If not attacked, and most likely would go off on a strike if he saw any one watching him. The *modus operandi* of this spider at his work would be a very interesting study. Who will take the time to investigate and report upon this unique species of architecture?

Astronomical Progress.

During the past two years there has been much valuable progress made in astronomical science, especially in the line of photographing certain nebulae and other star clusters. Photography has also brought to light many very faint (gaseous) nebulae which the telescope fails to detect. The moon's surface has also been photographed, and its minutest details brought out with a distinctness hitherto unknown.

The 1474 photographs of the transit of Venus for 1882, taken by the American astronomers at Washington and elsewhere, have been reduced, and the solar parallax resulting therefrom is 82 in. 347, which corresponds to a mean distance of the earth from the sun of 92,335,000 miles, with a probable error of only 125,000 miles. These numbers are no doubt close approximations to the truth, but they cannot be regarded as final until all the observations made by astronomers in other countries are reduced and discussed.

Six new asteroids have been discovered within a year. They are all exceedingly small bodies for primary planets, and are situated in that immense region between Mars and Jupiter.

A very valuable discovery of great practical importance in the manufacture of astronomical telescopes has been made by two distinguished German physicists, Prof. Abbe and Dr. Schott,

of Jena, Germany. The great defect in all large telescopes of the refracting kind is the secondary spectrum, due to the fact that the lenses composing the object-glass do not focus all the refracted rays at the same point. By using different kinds of glass, opticians have succeeded in bringing together two widely differing rays of light, the red and the blue, but have not succeeded in bringing together all the other intermediate rays, so as to form a colorless image, owing to what is called "the irrationality of dispersion." It is also claimed by the discoverers that the fool for visual and for photographic purposes are identical. All the telescopes hitherto made of the new glass have proved quite satisfactory in these respects.

The recent observations in regard to the mechanical character of the corona, if further observations should prove its correctness, will solve a most puzzling question and form a most important step in astronomical progress—one which will redound greatly to the reputation of the Lick Observatory, from whence the theory and preliminary observations were first announced.

THE HEAT EVOLVED BY ANIMALS.—Prof. Rosenthal of the Berlin Physiological Society has been experimenting on the heat given off by animals. According to *Nature*, he placed the animal to be experimented upon in a copper vessel that could be easily ventilated, and surrounded this vessel by a reservoir containing air, whose expansion or contraction was to give the means of determining the heat given off by the animal within. Although the dog used in the experiments was fed in exactly the same way at each meal, the quantities of heat produced varied very largely, and no considerable uniformity could be had without taking the mean of a long series of observations. Up to about the third hour after the meal the heat-production diminishes. It then rises rapidly and attains a maximum, after which, at about the eighth hour, it begins to fall again, irregularly, until the next meal. When an excess of food was given, the heat produced was always less than that calculated from the oxidation of the food; but with a uniformly constant diet, the mean value of the heat produced corresponded to the amount calculated. When the surrounding air varied in temperature between 41° and 77° F., all other conditions remaining the same, a minimum production of heat was observed at 59° F. From this point it increased uniformly in both directions—not only when the temperature fell to 41°, but also when it rose to 77°. The amount of carbonic acid gas given off by the animal agreed with the theoretical amount when the experiments were continued over a considerable length of time.

THE CHINESE LANGUAGE.—The impression generally prevails that the characters used to express thoughts and sounds in the Chinese language are necessarily multitudinous in form and character; but the fact is that when reduced, as it might be, to its minimum of characters, it is more simple than any language extant. There seems to be a long and short form of expressing sounds on paper. We see it stated that Rev. W. H. Murray, a missionary at Peking, has devised a system for teaching the blind, and has reduced the Chinese language to 408 syllables. By this system the blind have been enabled to learn to read with marvelous facility. So simple is the system thus inaugurated that the printing of books is produced at an amazingly low rate compared with books embossed for the blind in this country. Among the Chinese the blind are regarded with great consideration. The writer was informed many years ago by Dr. McGowan, a well-known Chinese missionary, and a person well acquainted with the Chinese language, that Chinese characters might be reduced to less than half the characters employed in the English language, and that when so reduced it would be the easiest language for use in telegraphing, of any in the world. The work of Mr. Murray in that direction seems to confirm the opinion of Dr. McGowan.

ANOTHER ALLEGED SUGAR PROCESS, by electricity, is announced. A correspondent of the *Louisiana State Planter*, of New Orleans, sends a letter from Havana, Cuba, in which occurs this notable paragraph: "You will receive by mail a small parcel containing some of the sugar said to have been manufactured at this place by the electric process invented by Messrs. Maigrot and Sobeslee, and of which all the Havana papers spoke some time ago. Said sugar is said to polarize 100°, and the inventors of the process affirm that sugar of the same kind can be obtained with their process from all sorts of juices of certain saccharine richness."

PLANT DYNAMICS.—The great force exerted by growing plants may be demonstrated by direct measurement. By an arrangement of harness and levers, President Clark of Amherst Agricultural College, made a growing squash register a pressure equal to thousands of pounds, when finally the harness broke. A tree in a graveyard at Hanover, Germany, has lifted more than five inches a block of stone containing 20 cubic feet.

UNIFORM TIME.—Germany has adopted a uniform standard of time for the whole empire. The fifteenth degree of longitude east of Greenwich is near the center of the empire, and when the sun is immediately over this meridian it is declared to be noon for the whole country.

GOOD HEALTH.

How to Live Long.

It is the opinion of Dr. Lewis A. Sayre, the famous surgeon, that everybody, under ordinary circumstances, should live to be one hundred years old. We live now on an average of from eight to fifteen years longer than our forefathers, but still we die prematurely. In his judgment it is possible for most of us to be centenarians, without neglecting the ordinary duties of life, if we observe certain laws of health. In an interview lately he makes many useful suggestions, which, if complied with, would tend to lengthen the average of life considerably. He says that the majority of people eat more than they ought, and too fast. In eating it is not a question of how much a person can devour, but how much he can digest. Water should be drunk at its natural temperature. Ice water, which people generally gulp down in unlimited quantities, paralyzes the nerves of the stomach, and is one of the greatest causes of dyspepsia in this country. Boiling water, drunk an hour or so before meal, is a valuable aid to digestion in many cases. Whisky is useful at times, like castor-oil, but it is not beneficial when used as a beverage.

Tobacco is decidedly injurious when used to excess. A mild cigar, smoked after dinner, however, has a soothing effect, and the smoker sustains less injury from it than he would from rushing off to work on a full stomach.

The average person ought to have eight hours' sleep. Some people who work at night and sleep in the daytime live to a good old age, but people who work during the day and sleep during the night are better off.

Open grates are far preferable to any other means of heating a house, for they help ventilation, which is an important factor in the prolongation of life.

The American people have too much to do, too much to think about, and too much care to bear. Many are very much distressed, as younger men, to know how they are going to make ends of a living. By and by, when their reputation has grown, they are driven to death with the work forced upon them.

Love of Life.

Phrenologists have assigned to a protuberance under the ear the faculty of "vitaliveness," or love of life, and some of them assume that in proportion to the size of the hump is the strength of the vital element in the individual.

However this may be, that the love of life is intense in some minds, and scarcely exists at all in others, nobody, of course, will deny; and it is no less true that persons who earnestly desire to live can keep a mortal disease at bay much longer than those who are comparatively indifferent to their fate.

The tenacity with which some men cling to life is marvelous. We had an instance of this in the case of a noted pugilist, several years ago, who was shot in the breast during a bar-room scuffle, and his condition was pronounced hopeless by the surgeons. But he scoffed at their opinions, and actually lived several days with a ball in his heart; keeping his hold upon life—so it seemed—by sheer force of will.

A resolute determination not to succumb is, as every army surgeon knows, the salvation of many a wounded soldier, who without it would assuredly die. In the Crimean war the mortality among the wounded Turks was much greater than among the wounded French and English. The latter wrestled stoutly with Death and often baffled him when their doom seemed inevitable; but the predestinarian Muselman, when dangerously injured, said gloomily, "It is my kismet" (fate), turned his face toward Mecca, and gave up the ghost.

There can be no doubt that love of life and vigor of will have been the means of restoring to health thousands of patients who but for these mental characteristics must have perished.—*New York Ledger*.

COLDS CAUGHT AT FUNERALS—Severe and fatal colds are often taken at funerals; but a new and very proper innovation has recently been made in several localities to prevent such occurrences. This consists of the use of silk skull caps, to be worn by the minister in charge and the hearers at the grave, also by the male members of the family and other attendants. The caps are put on in the carriage and the ordinary hats left there, the caps to be worn all the time at the grave. It will prevent many colds.

HOW TO TREAT A SNAKE BITE—A young man was bitten on his thumb by a rattlesnake, a few days since, near Stockton. The lad instantly cut through the wound with his knife and vigorously sucked out the poisoned blood. His prompt treatment saved his life, although he suffered severe pains from the wound for several days. It is quite generally known that such treatment will usually save life; but there are few who have the courage or thought to try it.

A DOCTOR who discourages nostrums tells his patients to take plenty of buttermilk and get plenty of sleep instead of a spring medicine.

USEFUL INFORMATION.

HOW BASE BALLS ARE MADE.—Automatic machines for making base-balls have been so successfully contrived that their introduction is likely to constitute an important practical industry. Each machine winds two balls at one time, according to the following movement: A little para-rubber ball, weighing three-quarters of an ounce, around which one turn has been made with an end of a skein of old-fashioned gray stocking yarn, is slipped into the machine, then another, after which the boy in charge touches a lever, the machine starts, and the winding begins, the rubber ball being thus hidden in a few seconds, in its place appearing a little gray yarn ball that rapidly grows larger and larger; when it appears to be about half the size of a regulation baseball there is a click, the machine stops, the yarn is cut, and the boy picks out the ball and tosses it into the basket. When this basket is full, it is passed along to another boy, who runs a similar machine, where a half-ounce layer of worsted yarn is put on. The next machine adds a layer of strong white cotton thread, a coating of rubber cement is next applied, and a half-ounce layer of the very best fine worsted completes the ball with the exception of the cover.

AN ALUMINUM FIRE ESCAPE—A new use has been found for the peculiar qualities of aluminum, by a Mr. J. Athey of Marion, Arkansas. The aluminum is rolled into a thin tape, capable of sustaining a weight of 1000 pounds. This tape is wound upon a small roll provided with a clutch. Mr. Athey recently gave an exhibition of his invention by letting himself down from the Marion suspension bridge nearly to the river below, a distance of 192 feet. One end of this tape was fastened firmly to the bridge, near the center. The man grasped the reel about which the other end was wound, and by means of a clutch was able to lower himself or stop at will. When he reached a point a short distance from the water, he hung until his photograph had been taken. The advantage of the aluminum over rope is the small compass into which it can be arranged, its light weight and great pliability.

FIRE AND WATER FROM THE SAME WELL.—Some gas-well borers in Marion, Ind., struck a stream of water at a depth of 250 feet. The water was oiled off and the well sunk 900 feet, when a powerful flow of gas was struck, the pressure of which lifted the casing and let in the water, producing a veritable geyser. A day or two afterward, a man named Jackson came to the derrick and struck a match to light his pipe. An explosion followed; the workmen were blown through the derrick, and Jackson narrowly escaped being roasted alive. The derrick was burned down. The strange spectacle is witnessed of a resistless volume of fire and water issuing from the same pipe. The column is shot to a height of 100 feet and escapes with a roar that is appalling. All efforts to restrain the well or even put out the fire have since proved futile.

LIQUID GLUE possesses great resisting power. It is particularly recommended for joining wood to metals; is prepared according to Heetz, as follows: Clear gelatine, 100 parts; cabinet-makers' glue, 100 parts; alcohol, 25 parts; alum, 2 parts; the whole mixed with 200 parts of 20 per cent acetic acid and heated on a water-bath for six hours. An ordinary liquid glue, also well adapted for wood and iron, is made by boiling together for several hours 100 parts glue, 260 parts water and 16 parts of nitric acid.

FLORIDA SHELL MOUNDS—It is said that no part of the United States contains so many remains of a former race as Florida, as shown in both the number and size of her mounds, some of which consist chiefly of shells and others mostly of sand. The shells in some of the mounds partake largely of the general characteristics of pliocene fossils, indicating that the mounds are of a very great age. The scroll-work on some of the larger shells and upon pottery indicates a Greek origin.

HOW THE GERMAN RUBBER PAVEMENT IS MADE.—A German paper says: The rubber pavement invented by Basson-Hannover consists of 85 per cent of ground stone and 15 per cent of a rubber mass, which, after a special treatment, is mixed with the stone powder. This pavement material is entirely even, and, when applied to the street on top of a layer of concrete, looks like asphalt, although not as smooth as this; it produces no dust, and is noiseless.

EMPLOYEES IN THE COAL INDUSTRY—The number of employees in this industry in the several States is 337,700, of which number Pennsylvania employs 208,000—91,000 of whom are engaged in the anthracite mines. The next largest employer is Illinois with 30,000; then comes Ohio with 25,000, and Iowa with 12,000. No State or Territory on the Pacific Coast is included in the enumeration.

BELOIAN FARMERS have become alarmed at the way in which the frogs are being exterminated by French pot-hunters, and have petitioned the King to forbid killing frogs during certain months of the year, as is done with

other game. The farmers regard the frogs as valuable slug and insect destroyers.

A MESSAGE was telegraphed from Mount Reno, near Fort McDowell, to Mount Graham, near Fort Grant, A. T., by the heliograph, 125 miles, in a single flash, and sent to Fort Huachuca, 90 miles, making 215 miles with a single intervening station. This was done last Friday. The longest distance heretofore has been 70 miles.

POLAR EXPLOSIONS IN ENGLAND.—Last year 53 boiler explosions occurred in the United Kingdom of Great Britain, resulting in the death of 25 persons and the injury of 53 others. Other accidents in connection with boilers caused death to 7 persons and injuries to 12 people.

ENGINEERING NOTES.

The Niagara Falls Canal.

The ship canal around Niagara Falls has been favorably reported upon by the Congressional House Committee on Railways and Canals. The bill provides for a ship canal built by the United States around Niagara Falls. The definite location is to be made by a board of five men appointed by the President, two of them to be army engineers, two civil engineers, and one "well-known citizen." The bill would appropriate \$1,000,000 to commence work, though the estimated cost on present plans is \$23,000,000. The new canal would be 21½ feet deep, 23 miles long, and the locks would be 400 by 80 feet.

The importance of such a work is fast commending itself to the country at large. The Canadian work of quietly deepening the Welland canal, so as to make it serviceable for the largest ships and men-of-war as well, is a subject which demands prompt action on the part of our Government to be as well prepared as our neighbor for all possible contingencies. Aside from the possible advantage it would give them as belligerents, we have the more near contingency of commerce. The incisive action of the Canadian Pacific railroad, and of the Canadians generally, looks to a sharp competition in the near future on a commercial plane. The Canadians have already entered upon a system of "globe-encircling steamers," which will start from Montreal, Halifax and New York in the fall, so as to avoid the summer heat in India and the Suez canal. The route will run through London, Gibraltar, Malta, Suez, Penang, Colombo, Calcutta, Hong Kong, Yokohama and Vancouver, and passengers will be on the same steamer throughout the voyage.

The enterprise which will carry out such a program will not fail to take the fullest advantage of a complete water-way for the largest ships from the head-waters of the Mississippi to the ocean. The United States will come far short of its mission if it does not take immediate steps to secure at least the business of our own territory for our own transportation, along this great and rapidly growing line of commerce.

The idea of a line upon our side of Niagara to compete with the Welland canal, which is purely a Canadian water-way, is not a new project. It is only the revival of an old one, dating its first inception more than a century ago—in 1794, when the first survey of this route was made. In 1798, it was again discussed and recommended by Mr. Gallatin. At that time the "Great West" was almost a terra incognita, and there was no commerce west of Buffalo. The Welland canal was not even thought of. But the War of 1812 showed the necessity of such a water-way, and it was built on the wrong side. There should be no delay by Congress in rectifying the mistake.

THE NIAGARA CANAL, notwithstanding adverse reports circulated by parties whose interest lies in another direction, is in a good state of progress and the work will be completed much faster than is generally thought. Fifteen thousand men will soon be employed, among whom there will be 4000 skilled mechanics, and the work will then be pushed through in very short order. The extreme unhealthfulness of Panama does not exist in Nicaragua, and there will be less loss of life from climatic influences than on the isthmus.

THE THREE BLADED PROPELLER lately substituted for four blades in the twin screws of the Hamburg-American steamship *Angusta-Victoria* has so increased her speed that she is reported as averaging 20 knots in an 8 hour trial near Hamburg. The Columbia, of the same line, which is now claimed to be faster than the City of New York or the Teutonic, is also to have three-bladed propellers.

CHEAP OCEAN STEAMING.—It has been computed, as an illustration of the great cheapening of ocean freights which has taken place in recent years, that half a sheet of note-paper will develop sufficient power, when burned in connection with the triple expansion engine, to carry a ton a mile in an Atlantic steamer.

THE EAST RIVER TUNNEL PROJECT is undoubtedly making progress and is being pushed with energy. It has been long obstructed in the Bridge and Tunnel Committee of the New York Board of Aldermen, and the projectors of the tunnel propose to know the reason why.

ELECTRICITY.

Increasing Uses for Electricity.

The increasing uses for electricity are wonderful to contemplate. It is just announced that the electric light will be largely employed in dyalog works, where also electricity may be employed for other purposes. At night the light permits the matching of colors as in daylight, and in the daytime the current will be employed for electro-chemical purposes.

It has also been introduced as a tooth extractor. The instrument consists of adjustable prongs carrying buttons and connected with an electrical battery. The buttons are placed on the face over the nerve leading from the teeth to the brain, and a circuit is established the moment the extracting instrument touches the tooth to be removed.

Electric soldering is another late invention, which will do away with the cumbersome and inconvenient soldering rod which has been in use from time immemorial. The electric implement can be made much shorter and lighter and used without the heat being felt by those who handle it. Another advantage is that it never cools off unless the connection is broken. It is intended for use in large tinmith shops, where many are constantly employed.

An electric measuring device is one of the latest scientific applications of electricity, by which distances of visible but unapproachable objects can be readily measured. This method takes the place of the ordinary calculation, by which distance is measured by the difference of an angle from a known base line. By the new instrument the difference is obtained more readily and with a greater degree of accuracy. In practice two telescopes are used at a known distance apart and the principle is based upon the fact that by a simple electrical arrangement no current will pass unless the two telescopes are exactly parallel. The observer notes on one of the two telescopes the angle required to prevent a current from passing through the instrument, and thus measures or rather electrically weighs the difference in the angle. Thus a single observer, with an unlearned assistant, can determine with great rapidity the exact distance of a vessel or other object. The range-finder is designed for use in naval warfare to allow accurate firing of great guns, but if it proves as satisfactory in practical use as is claimed, it should prove far more useful in the pursuits of peace, where the determination of the exact distance of inaccessible objects is often of great importance.

An electric heater in the form of a floor mat constitutes one of the latest applications of electricity to household purposes. An excellent device for warming the toes, says the *Electrical Engineer*.

Electricity as a Motor.

Very general attention is being called to electricity as a motor on street railways. Under the latest improvements it is said to have proven such an eminent success and is so much more economical than either horse or cable power, that it is soon destined to become very generally the power for street-railway service. It is estimated that anywhere from 20,000 to 50,000 horses now in use will soon be thrown out of use by the coming motor.

The progress of the electric railway, especially in the United States, is shown in an article in the April number of *Scribner's Magazine*, in which the prediction is ventured that in ten years there will not be a horse railway in operation in this country, while the speed will be greatly increased in consequence of the greater control which the engineer will have over his car than can be obtained on either cable or horse-car roads.

It is claimed that the number of electric railways now operating and in course of construction in the United States is 179, representing 1260 miles of track.

Improvements in electric motors are constantly being announced. It has just been reported that a Pennsylvanian has invented an electric motor that excels any yet discovered. Once started, it is claimed, the motor will run 10,000 hours without requiring attention. A motor that will run for that length of time would be a novelty indeed.

Another report says that a new electric locomotive, just completed in New England, and designed to tow as many as four cars, weighs seven tons, and the size of the wheels is 36 inches. It is run by two motors of 20-horse power. It has an air-brake run by a one h. p. dynamo with a wheel. It runs easily 20 miles an hour. It has a fender much like the cow-catcher of a steam locomotive.

MYSTERIES OF ELECTRICITY.—Says the *Birmingham, Conn.*, correspondent of the *Ancient Sentinel*: As an illustration of what a subtle but strong power electricity is, one can see, at times when an electric car runs off the track, an interesting example. Saturday, a car was off with all the wheels away from the rails, but the motor-man took a light copper wire, connected it with the springs on the forward truck, then fastened the other end to a hammer-head and placed the hammer on the rails. This completed the circuit and sufficient current was sent through the little wire to move the car on the rough ground.



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SAN FRANCISCO:

Saturday, May, 31, 1890.

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Business Announcements.

(NEW THIS WEEK.)

Patent Blow-Pipe and Assay Furnaces—Wm. Hoekins, Chicago, Ill.
De frequent Sale Notice—Gold Hill Mining Company.
Dividend Notice—Pacific Borax, Salt and Soda Company.
Agent and Com. any Promoter—Wm. H. Conley.
Only Mine For Sale—Nolan & Smith, Los Angeles.

See Advertising Columns.

Passing Events.

The Free Coinage Silver Convention of Nevada was commenced at Carson on Thursday of this week. As a leading silver-producer among the mining States, Nevada is vitally interested in the questions relating to the free coinage of silver.

The water in the Carson river is now at a higher stage than in any year since the mills were erected on its banks, and the pan-rooms are being flooded, rendering it impossible to operate more than two of the mills. While the present flood in the river will temporarily curtail the hullion yield of the Comstock mines, millmen are confident that the vast piles of snow still banked up in the Sierras will furnish water-power for operating the river mills throughout the summer, whereas in dry seasons the stamps are usually hung up from three to four months.

A movement is on foot in this city to obtain money to offer as a bonus for another transcontinental railroad to enter this city. Thence far, upward of \$70,000 have been subscribed. It is the intention to give the honor to the first road which enters the city, aside from that which now has its terminus here.

PETER HAMMERSTEIN, an employe of the Pacific Rolling-mill, had his elbow caught in the machinery, and before he could be extricated his right arm was frightfully crushed. Dr. Bunker amputated the member at the receiving hospital.

Gold Mining in California.

Rightly pursued, gold mining in California ought to be the safest and best-paying industry in which our people could engage. Our mineral territory is rich in the various forms of deposits of gold and of almost illimitable extent. For some 700 miles in length is a mountainous belt, in most parts of which gold is found. There are gold mines in San Diego county close to the Mexican border, and gold mines in Siskiyou and Del Norte counties, on the Oregon border, while between these extremes, on the gold belt, there is not a county where there are not more or less mines.

The mines and the country are open to all. They have not been, and never can be, monopolized to any injurious extent. The natural facilities for prosecuting the business are generally good. In most places there is water, and nearly everywhere timber. The climate is favorable. Forty years' experience has evolved the best methods of operation and improved appliances. It is known exactly what can be done with certain grades of ore and of gravel, and whatever uncertainty there may be lies in the character or permanency of the deposits themselves.

For the product of a gold mine there is always a prompt cash market. It never suffers by competition. There is no doubt about its ready sale. Trusts nor combinations do not affect it, and freight rates or distance have no disturbing influence. It is the basis of values; the standard for all other products; and the one thing for which everything else is produced and bartered. No legislation is needed for it; all countries receive it on an equality, and all men strive for it.

The mining for gold is a healthful, manly occupation, incapable of being overdone or excessively crowded. With a hundred times as many mines as we have, the products would not lessen in value nor would there be competition between the producers. There are quartz mines, hydraulic mines, drift mines, bar mines, river mines, beach mines, river bed mines, gulch mines—all producing gold, all being worked in different ways for the same product. Where rightly undertaken and prudently carried on, this work is attended with as little uncertainty as most other callings. There are of course blanks as well as prizes; but so there are in all industries. But the era of speculation having passed by, and that of legitimate business in this industry having been established, it is now conducted in this State on the same basis that exists in other enterprises.

THE STRIKE at Cokedale, Montana, has been settled, and the miners have returned to work. The terms of the agreement are that the miners shall receive \$1.10 for hard coal and \$1.05 for soft coal per ton of 2240 pounds. Laborers' wages around the mines will remain as formerly, \$2.50 per day. All the old hands who have committed no violence will be given work, but a few will be excluded from the mines. The men also agree to boycott two saloon-keepers, who, the company claim, have been the principal agitators of the strike.

A FROZEN MAN.—The schooner Dashing Wave has arrived in port from Sand point. Among her passengers from Alaska was John McLachlan, a Scotchman, who has been engaged in mining for several years. As a result of exposure his hands, ears and feet were frozen. Several fingers of his right hand have dropped off, leaving the flesh exposed, and some of his toes have also decayed.

EIGHTEEN MONTHS AGO, Mrs. Theodore Sutro resolved to try the influence of music on the average mining-camp child, and invited all the youngsters of Sutro, Nev., to singing lessons at the Sutro mansion. Instruction in slugging has been continued until the scholars of the tunnel town are all adepts. By a concert, they raised money and made needed improvements in the school building.

THE National Geographical Society has decided not to abandon the expedition to Alaska, and it will start some time next week. By direction of the Secretary of the Navy, the ship Pinta has been furnished for the trip.

Two large lumber-mills at Acacortes, Oregon, are kept running day and night to fill orders from the railroads for bridge timber.

Aluminium.

There is no other metal on the earth so widely scattered and occurring in such abundance as aluminium, yet it is never found metallic. But the combinations of aluminium with oxygen, the alkalies, fluorine, silicon and the acids, etc., are so numerous and occur so abundantly as not only to form mountain masses but to be also the bases of soils and clays. Especially numerous are the combinations with silicon and the other bases, which in the form of feldspar and mica mixed with quartz form granite. These combinations, by the influence of the atmosphere, air and water, are decomposed, the alkali is replaced or carried away, and the residue forms clays, the clays form soils, and thus the surface of the earth becomes porous to water and fruitful. It is a curious fact that aluminium has never been found in animals or plants, which would seem to show that it is not necessary to their growth and perhaps be injurious. Most of the aluminium compounds appear dull and disagreeable, such as feldspar, mica, pigments, gneiss, porphyry, trachyte, etc., yet there are others possessing extraordinary luster and so beautiful as to be classed as precious stones. Among these are the ruby, sapphire, garnet, turquoise and topaz.

One would suppose that since aluminium occurs in such abundance over the whole earth that we literally tread it under foot. It would be extracted and applied to numberless uses, being made as abundant and useful as iron. But such is not the case. Bauxite and cryolite are the minerals most used for producing aluminium, and their preference lies mainly in their purity. Native alums generally contain iron, which must be removed by expensive processes. Bauxite comes from Austria and France and has only been found in this country in Floyd county, Georgia. Cryolite comes from Greenland. It has been found in Colorado in very small quantity. Native sulphate of alumina has been found on the Gila river, Socorro county, N. M.

Those interested in the details concerning the physical properties of this metal, the processes for obtaining it and making its alloys, are referred to a book by Joseph W. Richards, entitled "Aluminium, Its History, Occurrence, Properties, Metallurgy and Application." The work is a well-written one and is sold for \$5 by the publishers, Henry Carey Baird & Co., Philadelphia.

Foundry Notes.

The strike of the iron-molders of this city has now lasted over 12 weeks and they are still out. Meantime, while the foundrymen have been greatly inconvenienced, new men have gradually been brought in from the East and now the shops are all running. Altogether 161 men and 40 boys struck in the 12 foundries. This occurred on March 31, but as soon as possible men were brought from the East and more are coming. While the shops have not yet their full quota of men, they are all doing very well under the circumstances, and the foundrymen are confident of eventually winning the contest. The molders, are, however, represented as equally confident, and have made no advances toward a settlement of the difficulties. The foundrymen are indifferent as to the attitude of the molders, being satisfied they can get on without any of the men who voluntarily left their work. A number more men came this week, seven of them having gone to the Risdon Iron Works.

During the past three months the foundry business in this city has been dull and unsatisfactory, mainly owing to the strike, and considerable work has been sent away which should have been done here.

In carrying out the contract for the new California-street cable line, the Risdon Iron Works must make some 300 tons of castings among the rest of the work, but they now have plenty of competent men to do this. This is the largest contract which has been let here since the strike commenced.

Mr. A. P. Brayton, after having been one of the proprietors of the Pacific Iron Works for 35 years, has retired from the firm and will hereafter be associated with the Pelton Water-Wheel Co.

A vast amount of work is being done on the new cruiser San Francisco, at the Union Iron

Works, and the yards now present a very busy sight. There are two large vessels undergoing repair on the dry-dock.

California Asphaltum.

Asphaltum is mined to a considerable extent in this State, but the annual production is quite irregular, being governed by the local demand. When a great deal of iron pipe is being laid, large quantities of the substance are used in coating it. Asphaltum is found in the counties of San Luis Obispo, Santa Clara, Ventura and Santa Barbara. Between 2000 and 3000 tons a year are shipped from the deposits.

The mines of the Ventura Asphalt Co. in the Canyon Diablo, Rancho San Miguelito, have come into prominence since 1888, when they were discovered. The material is found at or near the surface. About 1800 tons have been so far shipped from this deposit. More or less prospecting work has been done, but now large cuts or tunnels are being run into the deposit. At the point now being worked the elevation above sea level is 1300 feet, but frequent fossils of shells, shark's teeth, etc., are found, showing that the mass came up from the ocean.

The vein or bed crops out at many points in the shape of fingers or rounded masses connecting with the main body, the width and length of which are unknown, but upon which breasts of 45x16 feet have been worked.

The quality of this asphaltum is unique, possessing as it does great toughness and hardness, and a larger amount of fixed bitumen than other known deposits. The percentage of fixed bitumen is 24.40. It fluxes readily in oils, coal-tar, and by hydrocarbons, and may be made permanently of the hardness of stone or the pliability of india rubber, according to kind and quantity of flux (solvent) employed and the manner and time of melting, etc.

It has been successfully employed in street paving, and is found not to soften by heat or crack by frost. It is in use for this purpose in several cities in this State, Utah, Washington, British Columbia, Mexico, Guatemala, Sandwich Islands and Australia. For cementing masonry it has been put to use in San Francisco, Santa Barbara county and other places. The Southern Pacific Co. built a piece of seawall along the seashore, Ventura county, which was built up of round cobbles, cemented together by this asphalt. Two years' trial shows no indications of the wall being injured.

A peculiarity of the Ventura county asphalt is that it is elastic. The Santa Ana Water Co. used it for plastering a reservoir, having first laid up a wall of cobblestones on puddle and then plastering this with hot asphalt. In this open reservoir no change in the material is seen; even in places where the wall settled and cracked, the coating stretched and bent, remaining perfect and sustaining the water pressure. A pile coated with this asphalt was driven at Goat Island without destroying the coating. In doing this, the weight of 3000 pounds was dropped 22 feet on the pile. The material can be used for coating iron, planks, pipes, etc. Inquiries for the substance from the Eastern States, England, France, Australia, and Central America promise an important shipping business, unless other deposits with such exceptional properties are found.

THE REVENGE GOLD MINING Co., incorporated in this city this month, intend working 125 acres of a placer bar on the north fork of the Salmon river, Liberty district, Siskiyou Co. The gravel averages 40 feet deep, and the estimated value is \$7000 per acre. The water rights controlled are 5000 miner's inches, and 300 feet hydraulic pressure can be obtained. There is unrestricted liberty to dump debris in the streams, there being no agricultural lands and no navigation. They can have a mining season of eight or ten months, and will spend \$10,000 in improvements on the claim. Frank H. Hall is superintendent, Joline Howes president, and J. W. Pew secretary.

MRS. RICHARD A. PROCTOR, the widow of the famous astronomer, is visiting the Lick Observatory on Mount Hamilton, where she is the guest of Prof. S. W. Burnham. During her whole married life Mrs. Proctor ably assisted her husband in his astronomical observations and in the preparation of many of his interesting books. She has become well qualified to write and lecture on astronomical subjects.

The Deep Gold Placers of California.

(Concluded from page 362.)

Switzerland is crescent-shaped; its length is about 45 miles, greatest width 8½ miles, and extreme depth 1095 feet. The present surface is 1230 feet above sea level. It has an area of about 260 square miles. All of these lakes are now being filled with silt from somewhat distant glaciers—Maggiore by the Ticino, Como by the Mera and Adda, and Geneva by the Rhone.

It is a curious fact that these lakes, like the glaciers, are crescent-shaped or at least curved. The map (Fig. 17) from Biedeker's "Switzerland" shows the position and form of the Alpine lakes and the striking resemblance they bear to the so-called ancient river channels of California. And it is fair to assume that these beds are exceedingly irregular and

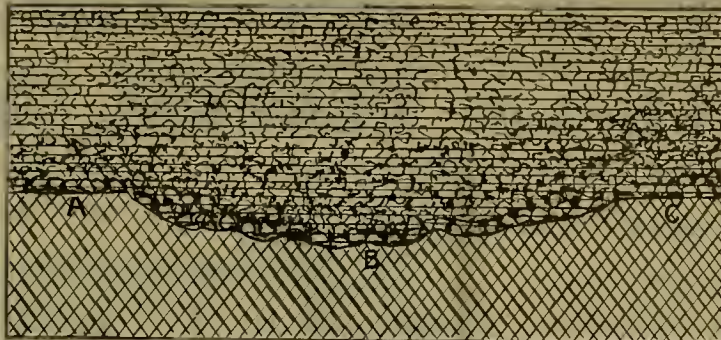


Fig. 18. - DEPRESSION IN GRAVEL MINE, PLUMAS COUNTY.



Fig. 7. - IDEAL VIEW OF A TABLE MOUNTAIN IN CALIFORNIA.



Fig. 16. - SPANISH PEAK, SEEN FROM ONION VALLEY, BASE OF PILOT PEAK

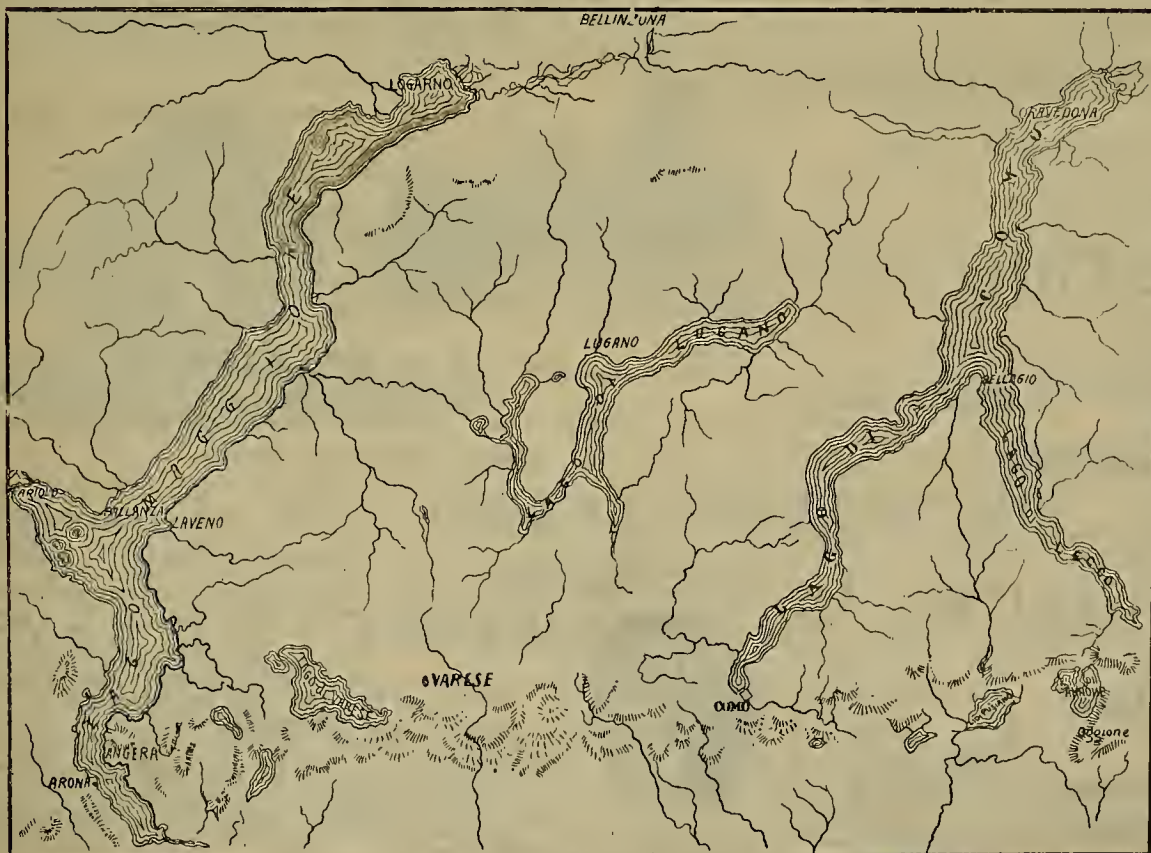


Fig. 17. - POSITION AND FORM OF THE ALPINE LAKES.

deeply channeled by the glaciers that formed them.

Glacial lakes are sometimes formed by terminal moraines, after a deep channel has been excavated by the glacier, also by landslides, many instances of which are on record.

In the opinion of Gaskie: "The only agent capable of excavating hollows out of solid rocks such as might form lake basins, is glacial ice. It is a remarkable fact, the significance of which may now be seen, that the innumerable lake basins of the northern hemisphere lie on the surfaces of intensely ice-worn rocks, the strata can be seen on the smooth rock surfaces slipping into the water on all sides. These strata were produced by the ice moving over the rocks. If the ice could, as the strata prove, descend into the rock basin and mount up the farther side, smoothing and striating the rock as it went, it could, to a certain degree at least, erode basins."

When a glacier flows over an uneven bedrock, some portions of the ice remain practically stationary, while others continue to move on. In this manner lake-beds are scooped out deeply if the rock is soft, for the crushing-power of the superincumbent ice is very great. This peculiarity of a glacier has an important bearing on our subject.

Mr. W. S. Chapman of San Francisco informed me that in the Union Consolidated Drift mine, at Portwine in Plumas county, a lake-like depression was discovered to which there was no outlet, the whole area, 40 feet deep and half a mile wide, being wholly prospected. There is no doubt as to the truth of this statement. The depression is filled with large boulders which lie also on the bedrock. At A and C as well as at B (Fig. 18), a river cannot flow down such a depression and up the other, but glacial ice can.

My theory assumes an ancient lake-bed in Plumas and Sierra counties which I have named "Lake Trask." I have not yet traced out its boundaries, although I have seen numerous evidences of its former existence. I am of the opinion that all the placers of the two counties are within its area. If I should not be able to continue my study on this subject, I hope others may do so, and either prove or disprove this theory.

The Gates Ore-Crusher.

The Western Agency of the Gates crusher has been transferred from the Pacific Iron Works to the Pelton Water Wheel Co., 121 Main street. This crusher has already been adopted by many of our most prominent mining companies, as well as for road macadam, and parties using them claim great advantages over other forms in the matter of durability of wearing parts, as well as fineness of product.

ELECTRICAL EXECUTION.—The Supreme Court has decided that Kemmler must die by the electric method. Chief Justice Fuller delivered the opinion of the court, which says that the New York Legislature and the New York courts carefully considered the question as to whether death by electricity was inhuman and cruel, and decided it was not as much so as death by hanging and other methods which have long been employed by the civilized world. Such unusual and cruel punishments as burning at the stake, disemboweling, or other torture would not be recognized by the law of civilized nations, but there seems to be no evidence that death by electricity is more cruel than the methods recognized by the Constitution.

The new steamboat for the Donabue line has been launched, and was brought over to the city last week for her machinery, which was built by the Fulton Iron Works. The boat is 290 feet long over all, and on its keel 270 feet. Its beam covers 73 feet, while the depth of the hold is 15½ feet. The immense engine of 250-horse power intended for this steamer will be equipped with a 65-inch cylinder, with a 12-foot stroke, and it is estimated that the speed of the boat will be equal to that of the San Rafael. The boat will be built principally for freight traffic, and will contain room enough for 16 freight cars. There will be passenger saloons on either side of the lower deck. The vessel will cost, when finished, \$230,000.

LOSS BY SILVER DISCOUNT.—The total ore-product of the Con. Cal. & Va. mine in 1889 was 135,190 tons, yielding bullion the gross value of which was \$3,238,468.85. The discount on silver on the above yield resulted in a loss of \$550,539 to shareholders during that year—a sum sufficient to have dishorsed five monthly dividends of 50 cents each. The average yield in bullion per ton was \$24. In the quarterly official returns from the mine the discount on silver is deducted.

The mining companies at Butte City, Montana, are experimenting on deep mining with the most satisfactory results. The Gaynor shaft has been sunk to the 900 level, and will be put down to the 1000.

ADJUSTERS have settled the Hartley Mining Company's loss at Grass Valley, by Saturday night's fire, for \$3306. The policies were for \$4000.

CONTRACTS have been let in Inyo county for burning 50,000 bushels of charcoal for smelting purposes.

AN exodus of miners from Tuscarora, Nev., to Butte City, Mont., is reported.

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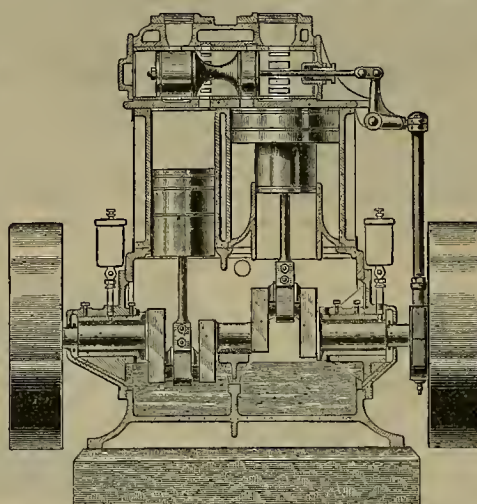
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4500 HORSE POWER.

JUNIOR, 166 ENGINES,
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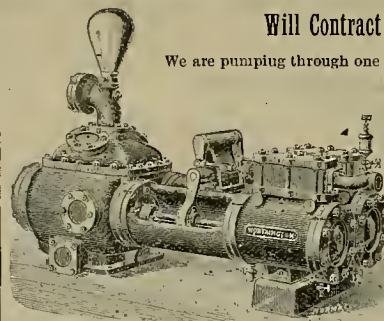
Will report on the condition and value of any mining property on the Pacific Coast. Rare Chemicals made to order. Instructions given in Assaying and Practical Chemistry.



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Will Contract to Pump any Elevation at One Lift.

We are pumping through one continuous line of pipe 114 miles long against a pressure equal to 3500 feet elevation.



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SUPPLYING WATER WORKS

Than all other Manufacturers in the United States Combined.

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FOR WHICH PUMPS ARE USED,
And against pressures up to 8000 pounds per square inch.

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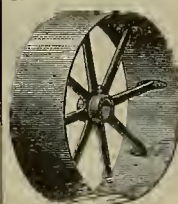
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NATIONAL WATER PURIFYING COMPANY,

Having the largest Artificial Plants in the United States in operation in Philadelphia and Chattanooga, having changed the next best system, in several instances, to the National. Any capacity guaranteed.



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For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

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AMALGAMATING MACHINERY.

Stamp Mills for Wet or Dry Crushing.
Huntington Centrifugal Quartz Mill. Drying
Cylinders. Amalgamating Pans, Settlers,
Agitators and Concentrators. Retorts, Bul-
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Concentrators, Evans', Calumet, Collom's
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GIVES THE HIGHEST EFFICIENCY OF ANY WHEEL IN THE WORLD.

OVER 800 ALREADY IN USE.

Affords the Most Simple and Reliable Power for all
Mining and Manufacturing Machinery.
Adapted to heads running from 20 up to 2,000 feet.
From 12 to 20 per cent better results guaranteed than
can be produced from any other Wheel in the Country.

ELECTRIC TRANSMISSION.

Power from these Wheels can be transmitted long
distances with small loss, and is now extensively used in
all parts of the country for generating both power and
light.

APPLICATIONS

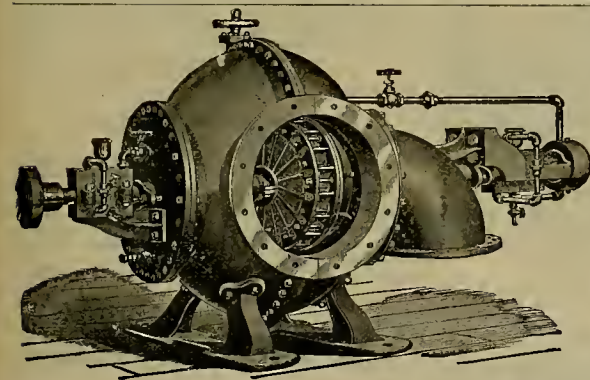
Should state amount, and head of water, power required,
and for what purpose; with approximate length of pipe;
also, whether the application is with reference to *Wheels*
or *Motors* described below. SEND FOR CIRCULARS.

The Pelton Water Wheel Co.

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PELTON WATER MOTORS.

Varying from the fraction of 1 up to 15 and 20-horse power. Unequaled for all light-running machinery. Warranted to develop a given
amount of power with one-half the water required by any other. SEND FOR MOTOR CIRCULAR. ADDRESS AS ABOVE.



JAMES LEFFEL'S Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and
high heads are utilized, and are guaranteed to give more power with less water than
any other wheel made. Being placed on horizontal shaft, the power is transmitted
direct to shafting by belts, dispensing with gearing.
Estimates furnished on application for wheels specially built and adapted in
capacity to suit any particular case.
Further information can be obtained of this form of construction, as well as the
ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost,
by applying to the manufacturers.

JAMES LEFFEL & CO.,

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GRASS VALLEY, CAL.

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And Assay Office.**

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**BLUESTONE,
LEAD PIPE,
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ALSO MANUFACTURERS OF
Standard Shot-Gun Cartridges,
Under Chamberlin Patent.

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IMPORTERS AND DEALERS IN

**ASSAYERS' MATERIALS, MINE
AND MILL SUPPLIES,**

ALSO CHEMICALS, AND PHYSICAL, SCHOOL AND
CHEMICAL APPARATUS.

68 & 65 First St., cor. Mission, San Francisco.

We would call the attention of
Assayers, Chemists, Mining Com-
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Balances, Furnaces, Muffles, Crucibles, Sori-
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Chemicals.

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Pacific Coast, we feel confident from our experi-
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goods, both as to quality and price.

Agents for the Morgan Crucible Co.,
Battersea, England. Also for E. G. Denli-
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of this well-known manufacturer are thoroughly reli-
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Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED 1869.

Ores worked by any Process.

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Analyses of Ores, Minerals, Waters, etc.

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BATTERY SCREENS.

Best and Cheapest in America.

No imitation, no deception, no planished or rotten
iron used. Only genuine Russia iron in Quartz Screens.
Planished iron screens at nearly half my former rates.

I have a large supply of Battery Screens on hand
suitable for the Huntington and all Stamp Mills, which I
will sell at 20 per cent discount.



PERFORATED SHEET METAL

For Flour and Rice Mills, Grain Separators, Revolving
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Zinc and other metals punched for all uses.
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Mining Screens a specialty, from No. 1 to 15 (fine).

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This Fire proof Brick Building is centrally located, in
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Laundry Free for the use of Families.

HOT AND COLD BATHS FREE.

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And Upward.

Rooms with or without Board,
Free Coach to the House
J. POOLEY.

MARKET REPORTS.

Local Markets.

SAN FRANCISCO, May 29, 1890.

General trade is only fair. High water in some localities, melting snow in the mountains, harvesting in some sections, and harvest work to be started soon in others are against an immediate active trade. The tariff and silver questions are also against a free movement in goods.

Among the foundries and machine shops there is more life, with larger orders received and being executed. The molders' strike is virtually a thing of the past.

The money market continues easy, with no urgent demand from any particular quarter, while remittances from the interior are free. Large sums of money will be wanted in July, August and September with which to move the wheat crop.

MEXICAN DOLLARS—The market is quiet since the sailing of the last steamer for Hong Kong, and is strong at 80¢@81 cents.

SILVER—The market in London has held easy but steady, but in New York there was a gradual shading in prices. The action of the market looks as if the manipulators of silver certificates are bidding for shorts, and not to corner silver against the Mint, as the Director is reported as saying. The manipulation of silver presents a broad speculative field in this country, and also abroad, for all securities and commodities whose value is controlled by the price of silver move in sympathy with the latter. The recent advance and later decline in silver showed this to a remarkable extent, and more than proves the position this paper has taken on the question and the utmost importance of remonetizing silver. Leading English financial papers are beginning to advocate the further introduction of silver into circulation, with a strong leaning toward bimetalism. The action of Congress on the subject will have a strong bearing on the question abroad. It now looks as if no definite action will be taken by Congress on the silver bill until toward the close of June.

The local market has held steady at 103½ cts., Mint prices. Offerings are still light—said to be owing to the small output on the coast.

London cables quote silver to-day at 46½ d, a decline of ¼ d; while New York came through at 102½ cts., an advance of ¼ ct.

QUICKSILVER—Receipts the past week aggregate 92 flasks and exports 28 flasks to Guaymas. The market continues very strong under light obtainable supplies, good demand and strong markets abroad.

BORAX—Exports by sea the past week aggregate 335 lbs. to Honolulu and 100,264 lbs. to New York. Under a free output and offish buying the market is weak at quotations.

LIME—Receipts the past week aggregate 5406 bbls. and exports by sea 200 bbls. to Honolulu. The demand is only fair. While quotations are unchanged, some shading for round parcels can be secured.

LEAD—The market holds strong. At the East, continued activity is reported. The higher prices asked restrict any speculative movement. European advances report an easy market.

TIN—Imports the past week aggregate 100 boxes plate by overland rail, and exports 66,995 lbs. to Santa Rosalia. The market shows more strength, with plate fetching an advance. Prospective tariff legislation has some influence, as has the large run and active salmon canning on the Columbia river. It is also claimed that fruit-canners will use more this year. The higher price of silver is in favor of European holders.

COPPER—The market holds strong, with still better prices looked for if silver should advance to a higher range. The output in this country is steadily absorbed by home consumption and export demand. The latest London cables, May 22, to the Iron Age are as follows: A large business has been done in ingots at the advanced prices, and the demand is still heavy. A considerable quantity of matte has been taken for reshipment to America. Smelters and consumers are short of stock and have been anxious buyers, causing a steady reduction in spot supplies. Only small quantities are held by the trade, and a further rise is considered probable. French holders are conducting operations skillfully. At the present rate of manufacture, it is estimated that 12,500 tons more will be required this year for sulphate than was used last year. The visible supply decreased 3300 tons during the first half of the month.

IRON—The market is barely steady. The consumption is increasing, but the stock is large. The foundrymen are turning out more work, owing to having very nearly their full quota of molders.

COAL—Imports of coal the past week aggregate as follows: Seattle, 1150 tons; Tacoma, 2734; Coos Bay, 1200; Nainaimo, 1300; total, 6284 tons. The market for Australian is quiet but steady. For distant shipment there are sellers at slightly less than we quote, but these cargoes could not be expected here before the turn of 1891. English coals and freights are said to be too high to attract buyers. In coast coals the market is well supplied at unchanged quotations. No late advices are at hand regarding the miners' strike in the Wellington mine. Unless the strike continues for some time, it is not likely to have any effect on the coal market here.

Eastern Metal Markets.

By Telegraph.

NEW YORK, May 23.—The following are the closing prices the past week:

	Silver in London	Silver in New York	Copper	Lead	Tin
Thursday	47 1/16	1 03 1/4	15 10	4 20	20 85
Friday	47 1/16	1 03	15 10	4 20	20 85
Saturday	47 1/16	1 03	15 10	4 20	20 85
Sunday	47 1/16	1 03	15 10	4 20	20 85
Monday	47 1/16	1 03	15 10	4 20	20 85
Tuesday	47 1/16	1 03	15 10	4 20	20 85
Wednesday	47 1/16	1 03	15 10	4 20	20 85

NEW YORK, May 26.—California Borax is lower; refined and powdered, 83¢@84¢. The demand is light. Quicksilver is firm at the last advance, 73¢@74¢. The position of copper is strong here and abroad. Lake products held 15¢; Quincy sold at that; Arizona 14¢; Carling, 13¢. Nominally wants not large. Lead had a speculative advance. Sales, 900 tons, \$4.30@4.35; June and July, subsequently, \$4.40, down to \$4.20; last price high at close.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS

ASSESSMENTS.

COMP. NY.	LOCATION.	SECRETARY.	PLACE OF BUSINESS.
Acme M & M Co.	California, 10.	3, Mar 20.	June 2, J. M. Buffington.
Alpha Cons M Co.	Nevada, 4.	25, Apr 5.	May 16, J. S. Elliott.
Andes S M Co.	Nevada, 36.	25, Apr 10.	May 14, J. J. Hawkins.
Belcher M Co.	Nevada, 39.	50, Apr 23.	June 3, J. C. Perkins.
Best & Belcher M Co.	Nevada, 49.	25, May 17.	June 17, L. O. G. H. G.
Brodie Tunnel Co.	California, 16.	50, May 21.	June 25, J. C. Harvey.
Challenge Cons M Co.	Nevada, 4.	50, May 14.	June 17, J. C. Harvey.
Confidence S M Co.	Nevada, 14.	75, May 10.	June 13, J. A. S. G.
Cons Imperial M Co.	Nevada, 17.	5, Apr 17.	May 22, J. C. G. H. G.
Cons New York M Co.	Nevada, 3.	15, May 22.	June 26, J. C. G. H. G.
De Monte M Co.	Nevada, 3.	20, Apr 14.	June 17, J. C. G. H. G.
De Monte M Co.	Nevada, 3.	25, May 22.	June 27, J. C. G. H. G.
Gold Hill M Co.	California, 9.	25, Apr 17.	May 24, J. C. G. H. G.
Gould & Curry M Co.	Nevada, 64.	30, Apr 28.	June 3, J. C. G. H. G.
Gray Eagle M Co.	California, 17.	May 1.	June 1, J. C. G. H. G.
Hale & Norcross M Co.	Nevada, 17.	50, Apr 14.	June 5, J. C. G. H. G.
Harford M Co.	Nevada, 7.	2, Apr 8.	May 15, J. C. G. H. G.
Holmes M Co.	Nevada, 15.	28, May 19.	June 24, J. C. G. H. G.
Kentuck M Co.	Nevada, 21.	30, Apr 24.	June 3, J. C. G. H. G.
Locomotive M Co.	Arizona, 7.	5, May 1.	June 4, J. C. G. H. G.
Mexican M Co.	Nevada, 40.	25, Apr 23.	June 6, J. C. G. H. G.
Morning Star Cons M Co.	Arizona, 1.	2, Apr 30.	May 31, J. C. G. H. G.
Nevada M Co.	Nevada, 20.	50, Apr 8.	May 14, J. C. G. H. G.
North Belle Isle M Co.	Nevada, 17.	20, Apr 8.	May 14, J. C. G. H. G.
North Commercial M Co.	Nevada, 3.	25, Apr 23.	June 6, J. C. G. H. G.
Orion Cons M Co.	Nevada, 26.	10, May 9.	June 13, J. C. G. H. G.
Peerless M Co.	Arizona, 5.	10, Mar 28.	Apr 30, J. C. G. H. G.
Sig Belcher & Mides Cons M Co.	Nevada, 6.	30, May 5.	June 9, J. C. G. H. G.
Sierra Nevada M Co.	Nevada, 97.	50, May 10.	June 12, J. C. G. H. G.
Sierra Hill M Co.	Nevada, 26.	10, May 9.	June 13, J. C. G. H. G.
Teresa M Co.	Mexico.	10, May 9.	June 13, J. C. G. H. G.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING DATE
California G M Co.	California.	A. Chemant.	323 Montgomery St.	June 3
Calistoga Cons M Co.	California.	H. S. Fitch.	329 Post St.	June 2
Crown Point M Co.	Nevada.	J. Newlands.	329 Pine St.	June 2
Harford M Co.	Nevada.	J. Hermann.	303 California St.	June 3
Honestake M Co.	Dakota.	J. O. S. G.	323 Montgomery St.	June 10
Seg Belcher & Mides Cons M Co.	Nevada.	E. B. Holmes.	303 Montgomery St.	June 3
Sutter Creek G M Co.	California.	F. E. Luty.	330 Pine St.	June 3
Repton Coal Co.	Oregon.	D. D. Stark.	24 Sacramento St.	June 2
Van Victor Cons M Co.	California.	A. L. Brunner.	35 New Montgomery St.	June 2

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Champion M Co.	California.	T. Wetzel.	522 Montgomery St.	10.	Jan 20
Candelaria Cons M Co.	Nevada.	A. S. G.	323 Montgomery St.	25.	Feb 10
Caledonia M Co.	Nevada.	A. S. G.	323 Montgomery St.	25.	Feb 15
Con California & Va M Co.	Nevada.	A. V. Havens.	309 Montgomery St.	25.	Feb 15
Derbec Blue Gravel M Co.	California.	T. Wetzel.	522 Montgomery St.	10.	Apr 24
Idaho M Co.	California.	T. Wetzel.	522 Montgomery St.	2.50.	Mar 7
Mc Diablo M Co.	Nevada.	R. Heath.	319 Pine St.	1.00.	Oct 21
Pacific Borax Salt & Soda Co.	California.	A. H. Clough.	330 Montgomery St.	1.00.	June 10

San Francisco Metal Market.

WHOLESALE. THURSDAY, May 29, 1890.

ANTIMONY.	22 1/2 @ 23
BORAX—Refined, in carload lots.	8 @
Powdered " " "	8 @
Concentrated " " "	7 1/2 @
All grades jobbing at an advance.	
COPPER—	
Bolt.	23 @ 25
Sheeting.	23 @ 25
Ingot, jobbing.	17 1/2 @
do, wholesale.	19 @ 20
Fire Box Sheets.	23 @ 25
LEAD—Pig.	4 1/2 @ 5
Bar.	5 @ 5 1/4
Sheet.	7 @
Pipe.	6 @
Bolt, discount 10% on 500 bags Drop, @ bag.	1 55 @
Buck, @ bag.	1 75 @
Chilled, do.	1 95 @
TRIPLEX—B. V. steel grade, 14x20, to arrive.	4 75 @
B. V. steel grade, 14x20, spot.	4 75 @
Oboroal, 14x20.	6 75 @ 7 00
do, roofing, 14x20.	6 00 @
do, do, 20x28.	12 00 @
do, do, 20x36.	12 00 @
ORE—Eng. ton, spot, in blk.	13 50 @ 14 21
Do, do, to load.	12 00 @ 13 60
QUICKSILVER—By the flask.	50 @ 57 00
Flasks, new.	37 1/2 @
Flasks, old.	37 @
CHROME IRON ORE, @ ton.	10 @ 10 1/2
IRON—Bar, base.	3 @ 3 1/4
Norway, base.	4 1/2 @ 5
STEEL—English, lb.	16 @ 20
Ontario tool.	9 @ 9 1/2
Black Diamond tool.	9 @ 9 1/2
Pick and Hammer.	8 @ 10
Machinery.	4 @ 5
Toe Calk.	4 @ 5
IRON—Glengarnock ton.	35 @
Eglington ton.	35 @
American Soft, No. 1, ton.	35 @
Oregon Pig, ton.	35 @
Puget Sound.	35 @
Olay Lane White.	27 @
Shotta, No. 1.	35 @ 35 00
Bar iron (has price) @ lb.	34 @
Liverpool S. M.	20 @
Thoracic.	35 @
Gartsherrrie.	35 @
Barrow.	35 @
Thomas.	35 @
Cargollet.	32 @

Coal.

Per Ton.	Per Ton.
Australian.	7 25 @ 7 50
Liverpool S. M.	15 00 @ 17 00
Scottish Splint.	8 00 @ 9 00
Cardiff.	8 50 @ 9 00
SPOT FROM YARD.	
Wellington.	8 00 @ Seattle.
Greta.	8 00 @ Coos Bay.
Westminster Brynho.	9 00 @ Cannel.
Nainaimo.	9 00 @ Egg, hard.
Sydney.	8 00 @ Cumberland, in sacks.
Gilman.	7 00 @ do, bulk.
CANADIAN ANTHRACITE COAL.	
Egg, ship side.	\$12 50 @ Nut, yard.
Egg, yard.	15 00 @

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, term of subscription, and give it their own patronage, and as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

Don't Fail to Write.

Should this paper be received by any subscriber who does not wish to be beyond the time he intends to pay for it, let him not fail to write us direct to stop the paper (costing one cent only) will a fine. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall not receive demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

A GOLD NUGGET, weighing 37 ounces and worth \$700, has been found in the B. Bag mining district, Arizona, and is on exhibition at Prescott.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING MAY 8.	WEEK ENDING MAY 15.	WEEK ENDING MAY 22.	WEEK ENDING MAY 29.
Alpha.	1.00	1.30	1.10	1.25
Alta.	1.10	1.15	1.10	1.25
Andes.	.35	.40	.30	.45
Belcher.	2.10	2.30	1.50	2.10
Best & Belcher.	2.85	3.15	2.50	3.25
Bullion.	1.05	1.15	1.20	.95
Bodie Cons.	.70	.75	.55	.60
Commonwealth.	1.00	1.25	1.40	1.30
Cons. Va. & Cal.	4.25	4.70	4.10	4.85
Challenge.	1.15	1.30	1.25	1.30
Hollander.	2.50	3.05	2.50	3.20
Imperial.	1.40	1.50	1.30	1.45
Cons. Imperial.	.65	.70	.50	.65
Caledonia.	.45	.50	.40	.55
Crown Point.	2.45	2.60	1.75	2.35
Crocker.	.30	.35	.20	.30
De Monte.	.45	.50	.40	.55
Eureka Cons.	4.50	5.00	4.50	5.15
Exchequer.	.65	.70	.50	.65
Grand Prize.	.50	.55	.40	.55
Gould & Curry.	1.50	1.70	1.30	1.65
Hale & Norcross.	1.50	1.70	1.30	1.65
Idaho.	.25	.30	.20	.35
Justice.	1.40	1.65	1.40	1.55
Kentuck.	.65	.75	.65	.75
Lady Wash.	.25	.30	.20	.35
Locomotive.	1.50	1.70	1.30	1.65
Mexican.	2.95	3.25	2.50	3.45
Navajo.	.25	.30	.20	.35
North Belle Isle.	.90	1.25	1.20	1.30
Nev. Queen.	.65	.70	.50	.65
Oboroal.	1.05	1.10	.85	1.15
Opbir.	3.50	3.80	3.70	4.00
Overman.	2.10	2.35	2.05	2.30
Potosi.	2.75	3.25	2.75	3.10
Peerless.	.30	.35	.25	.30
Peerless.	.25	.30	.20	.35
Savage.	1.65	1.80	1.50	1.75
S. B. & M.	1.35	1.60	1.30	1.55
Sierra Nevada.	2.15	2.30	2.25	2.50
Sierra Blanca.	.25	.30	.20	.35
Scorpion.	.25	.30	.20	.35
Union Cons.	2.35	2.60	2.05	2.55
Utah.	.85	.95	.80	.90
Yellow Jacket.	2.50	2.65	2.50	2.75

Sales at San Francisco Stock Exchange.

THURSDAY, May 29, 9:30 A. M.	400	Gould & Curry	1.80	
1475 Alpha.	1.45	150	Grand Prize.	.45
150 Andes.	.85	150	Hale & Nor.	.70
200 Baltimore.	.35	300	Justice.	.35
250 Belcher.	.25	300	Locomotive.	.05
90 B. & Belcher.	.25	100	Locomotive.	.05
100 Bodie.	.60	150	Kentuck.	1.00
100 Bonanza.	.25	100	Mexican.	3.40
1550 Bullion.	.25	200	Occidental.	4.50
200 Challenge.	.35	200	Opbir.	.45
75 Collar.	.35	80	Overman.	.45
40 Commonwealth.	.75	575	Potosi.	6.25
1000 Cons. Imperial.	3.75	450	Savage.	2.00
100 Crown Cal & Va.	4.40	300	Union.	2.65
50 Crown Cal & Va.	2.60	150	Utah.	.85
700 Exchequer.	.90	350	Yellow Jacket.	3.05

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Notice is hereby given, that at a meeting of the Board of Directors, held on the 20th day of March, 1890, an assessment, No. 10, of 2 cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 11, No. 303 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of May, 1890, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 28th day of June, 1890, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
J. M. BUFFINGTON, Secretary.
Office, Room 11, No. 303 California Street, San Francisco, California.

The delinquent day of the above assessment is hereby POSTPONED to June 2, 1890, and the day of sale to MONDAY, June 23, 1890.

By order of the Board of Directors.
J. M. BUFFINGTON, Secretary.
San Francisco, May 15, 1890.

GRAY EAGLE MINING COMPANY, Location of principal place of business, San Francisco, California. Location of Works, Placer county, California. Notice is hereby given, that at a meeting of the Board of Directors, held on the 10th day of May, 1890, an assessment, No

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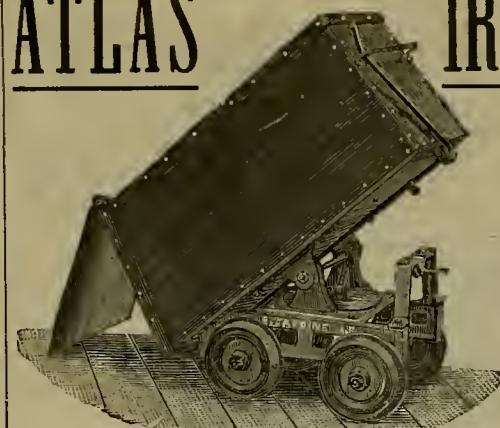
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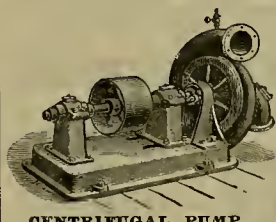
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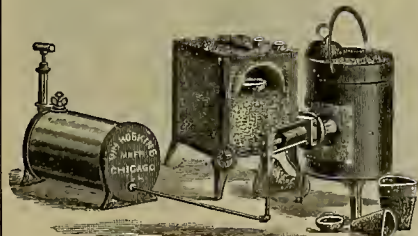
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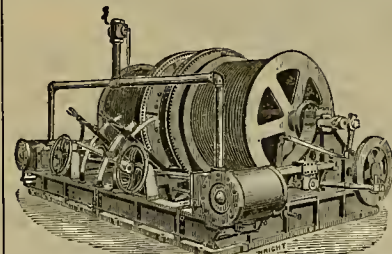
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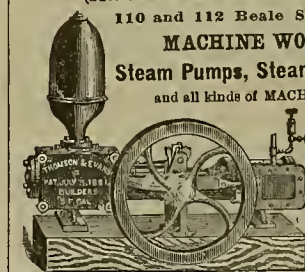
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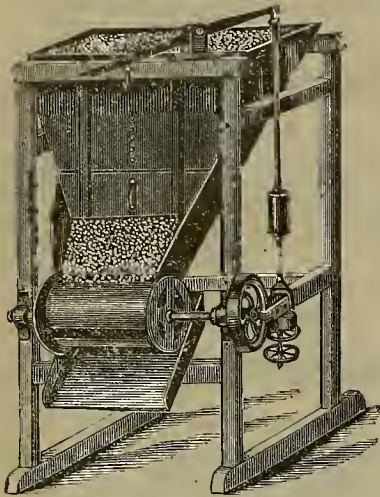
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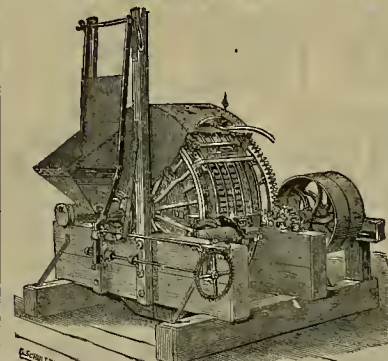
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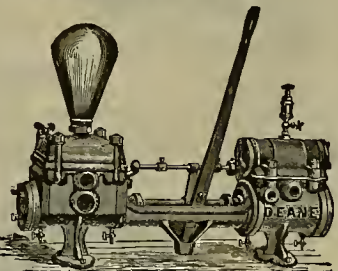
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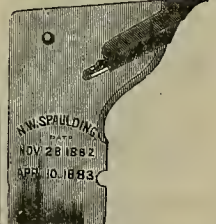
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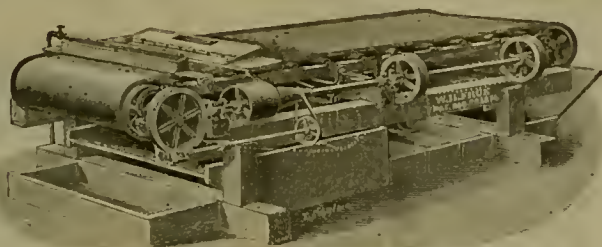
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There are Over 2200 Plain Belt Machines now in Use.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.
DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly,
THE MONTANA COMPANY (Limited).

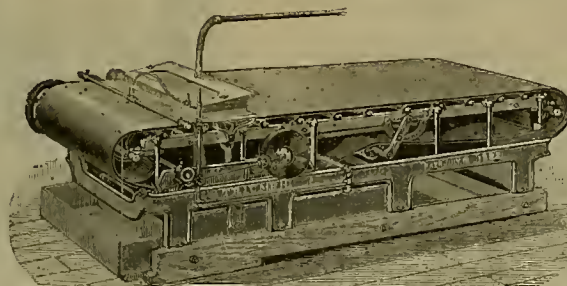
N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased.
ADAMS & CARTER.

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The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frue" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frue" Vanner is the best ore concentrator in the market. The fact that the "Frues" have improved (corrugated) belts does not militate against the superiority of the "Triumphs;" for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.

Price "Triumph" Concentrators, with Improved (Patented) Belt - - - \$650 f. o. b.
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JOSHUA HENDY MACHINE WORKS,
39 to 51 Fremont Street, San Francisco, Cal.

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Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

Original Empire Mill and Mining Company,
Principal Office, 401 California St., cor. Sansome, S. F.
Location of Works, Grass Valley, Nevada Co., Cal. }
GRASS VALLEY, NEVADA CO., CAL., Nov. 10, 1885.

Joshua Hendy Machine Works, 39 to 51 Fremont St., S. F., Cal.:

GENTLEMEN—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.

At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrators is the equal, if not superior to any other style of Vanners or concentrating devices.
DAVID McKAY, Jr.,
[Signed] Sup't North Star and Original Empire Mining Co.

N. B. When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.

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PATENT WIRE ROPEWAY,

For the Economical and Rapid
Transportation of Ore
and other material.

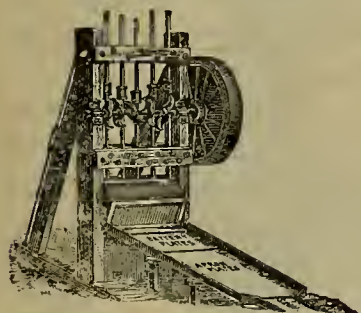
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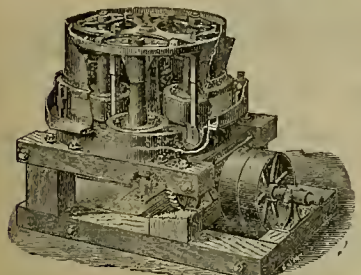


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These Plates can also be purchased of JOHN TAYLOR & CO., Corner First and Mission Sts

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Mining Machinery of Every Description.

Steam Engines and Shingle Machines.

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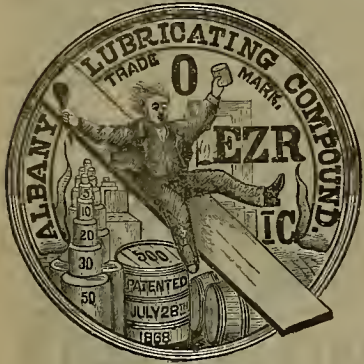
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Lubricating Compound and Cups.



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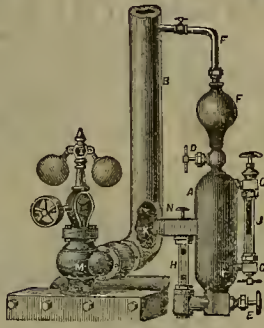
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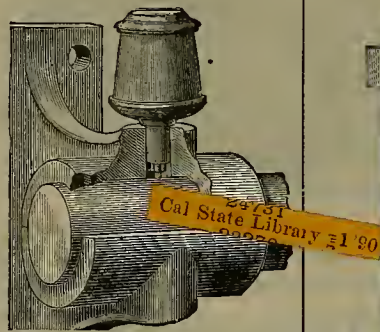
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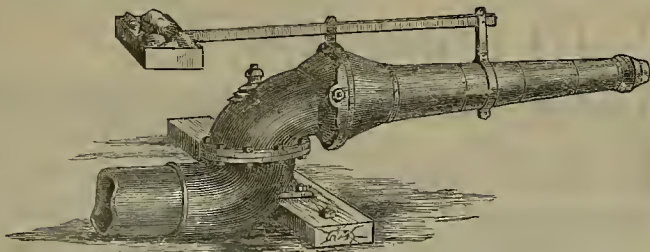
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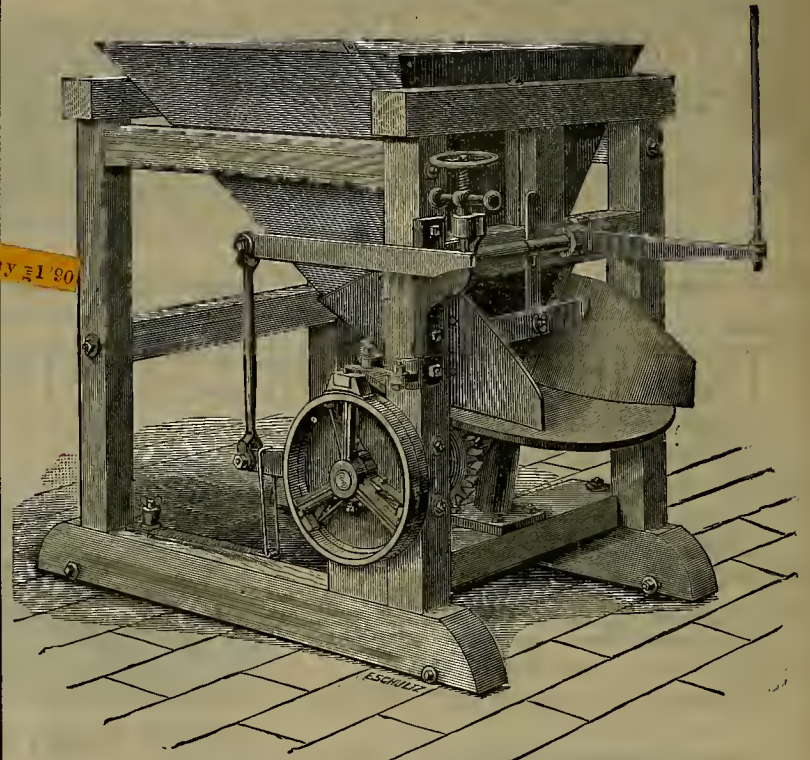
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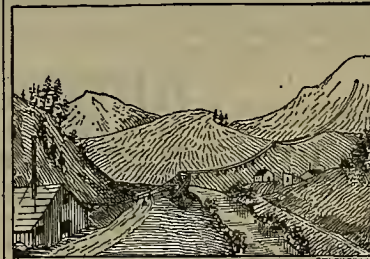
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FOR PULVERIZING ORES, WET OR DRY,

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An Illustrated Journal of Mining, Popular Science and General News.

VOL. LX.—Number 23.
DEWEY & CO., PUBLISHERS.

SAN FRANCISCO, SATURDAY, JUNE 7, 1890.

Three Dollars per Annum.
Single Copies, 10 Cts.

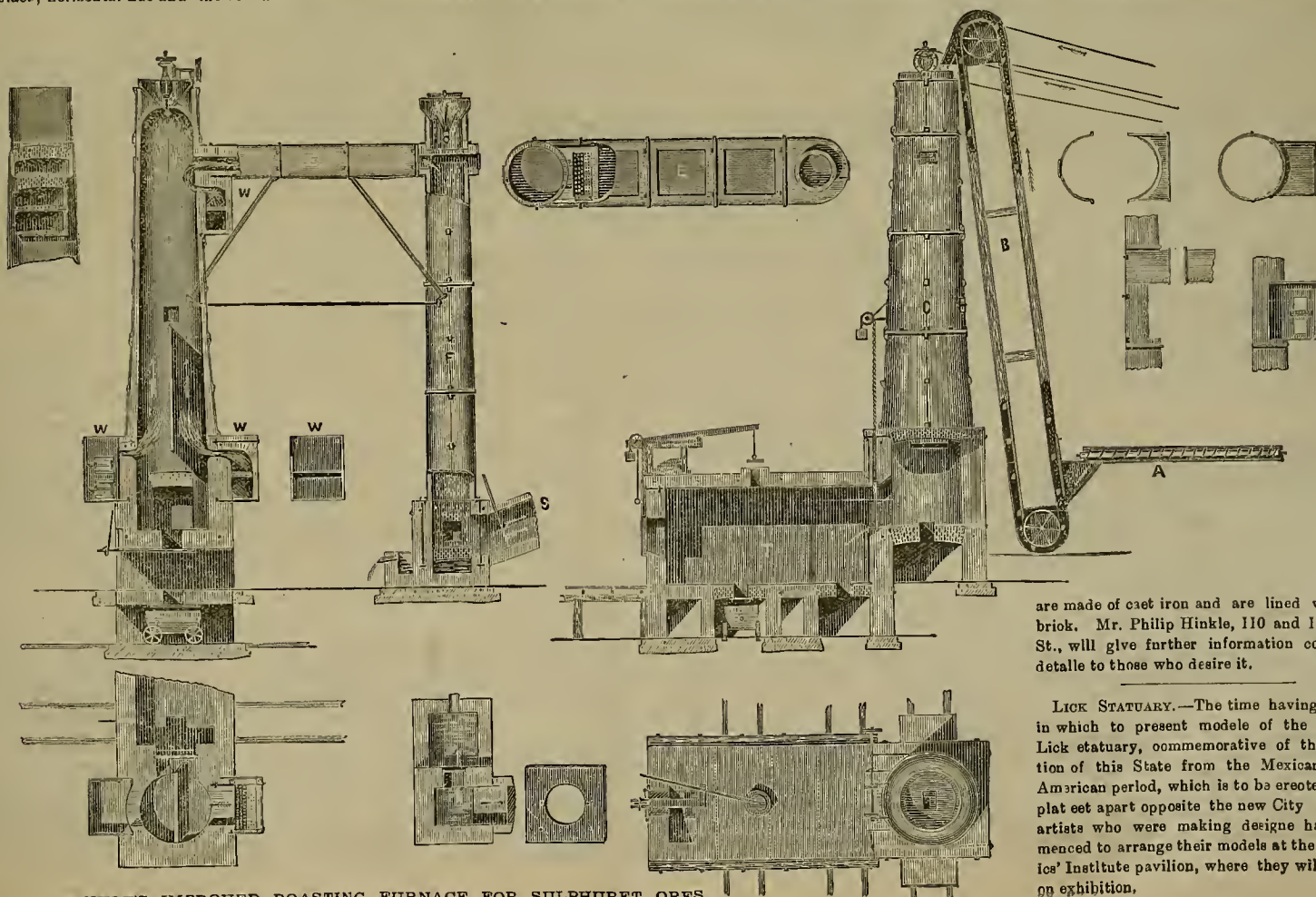
Hinkle's Ore-Roasting Furnace.

Engravings on this page show Philip Hinkle's improved vertical roasting furnace for sulphuretted ores. *A* represents the conveyor; *B*, elevator; *C*, vertical stack; *D*, section of stack; *E*, horizontal flue; *F*, shower flue; *S*, incline flue; *T*, cooling chambers; and *W*, the fires. The furnace consists of a vertical stack and cooling chamber, with two fires arranged near the bottom of the vertical stack and one near the top of the horizontal flue. There is a conveyor to feed the ore into the elevator buckets which carry it to the top of the stack and drop it into a funnel-shaped hopper. In this is a machine which drops the ore on to a revolving plate which throws it out by centrifugal force and distributes it uniformly in the top of the stack, so that every particle is worked upon by the fire to burn the sulphur as it drops from the top of the vertical stack to the bottom. There it piles up three or four feet deep. Then the gate is raised and it slides into a cooling chamber where it is raked in uniform height and remains until it finishes its work. After this, it is dropped into care and carried away, ready for amalgamation.

The light dust or ore carried by the draught through the upper fire goes through the horizontal flue into the shower flue, where it becomes dampened and drops to the bottom as the draught passes up the incline flue. Any accumulation of dust ores in the horizontal flue can be raked out. The outside shells of the vertical stack, horizontal flue and shower flue



ABANDONED HYDRAULIC MINE, SHOWING GROWTH OF YOUNG TREES.—See page 334.



HINKLE'S IMPROVED ROASTING FURNACE FOR SULPHURETTED ORES.

are made of cast iron and are lined with fire-brick. Mr. Philip Hinkle, 110 and 112 Beale St., will give further information concerning details to those who desire it.

LICK STATUARY.—The time having elapsed in which to present models of the proposed Lick etatuary, commemorative of the transition of this State from the Mexican to the American period, which is to be erected on the plat eet apart opposite the new City Hall, the artists who were making designs have commenced to arrange their models at the Mechanics' Institute pavilion, where they will soon be on exhibition.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

Powell's Arid Argument on Irrigation.

EDITORS PRESS:—In the April *Century* there is an article by Major Powell, entitled "The Non-Irrigable Lands of the Arid Region." The title has only a slight connection with the contents. The article is largely devoted to the forests of the arid regions of the West. As far as accepted scientific forestry is concerned, Major Powell's views are revolutionary. His only attempt to sustain views at variance with those now received with any data or proof is an indefinite citation of certain alleged investigations in the Wasatch range and elsewhere.

To set up such a bald and vague statement against the experience and writings of every prominent forestry man of whom we have knowledge, is certainly extraordinary. It would be so for any one; it is especially so for a prominent government official engaged in scientific pursuits.

We have indeed found in California that trees immediately about a spring or directly upon a water-course, do not always increase the flow of water, and may even diminish it either by such a detention as allows the percolation of the water into the soil, or by leaf evaporation. With us, riparian trees are gross water-users and usually deciduous, such as sycamores, alders, willows, cottonwoods, etc. Even in this case, the mass of testimony is in favor of the trees. The mountain springs and streams here sink in the valleys before finding a junction with the sea. As the trees on their immediate banks are cut, we find them sink lower, as a rule, and shorten their courses. In a foggy or cloudy day the water of these streams runs out farther into the valleys, so it does at night. We may compare the effect of the trees to the effect of the clouds or night in preventing or diminishing direct evaporation by the sun. The effect of some large water-using trees immediately about springs or on small streams is still an open question.

But upon the mountains the trees are of a different class, and their effect is, without known exception, beneficial to irrigators and water-users in the valleys below. Major Powell says, page 920, that forests may be useful on river-courses in humid countries to prevent the streams from being too large and creating floods, but that in arid countries the trees take up and evaporate about 40 per cent of the rainfall into the air; that the snows melt faster in forests, and that the volume of water in a stream will be larger if its watershed be bare than if it were wooded. "For all these reasons the forests of the upper regions are not advantageous to the people of the valleys who depend on the streams for the fertilization of the farms."

Such authorities as J. C. Brown, Becquerel, Marchand, Siemoni, Hummel, Piper, W. C. Bryant, Marsh, Van Reenan, Sorell, Ladouette, Canteguil, Wex, Berghaus, Maass, Grehenau, Ebermayer and a host of others are all without an exception known to me opposed to this view of Powell's. Time, place and instance have been cited over and over again to show that the denudation of mountain districts is followed by increased torrent or flood action and diminished regular flow in springs and streams, often by the entire desiccation of these. In my reading, as in my observation as a forest officer, I have never read or known of an instance to warrant Powell's theory. It is at variance with all the known facts.

In regard to Powell's statement that the evaporation from a forest surface is greater than from denuded hillsides, the data or proof are quite absent.

We have, on the other hand, a very considerable number of reliable experiments to show that Powell's statements are totally wrong. According to Ebermayer, for instance, the following percentages of the rainfall were found in the summer at the depth of one meter:

	With litter.	Without litter.
In open ground.....	39	14.....11
In the forest.....	62	72.....66
Difference.....	33	58.....54

Every one with the most common powers of observation and any experience knows that the soil remains humid longer in a forest than on bare open lands; so also snow remains longer under trees than in the open. Powell's article may please the forest-destroying interests, but its points are contradicted not only by authority, but by every American's experience of the effects of forest destruction upon the flow of streams. Here in California, instances are already piled up for the inquirer. Some of these may be found in the first report of the State Board of Forestry. When the forests are destroyed, the streams diminish. We have in such case our streams alternating between violent and destructive torrents and dry beds of sand and boulders.

The testimony on this point is so large, so circumstantial, so complete, so uncontradicted, that it becomes a waste of energy to confute further the mere *ipse dixit* of a special pleader.

Powell confutes himself, for he says a few lines further on in speaking of the proposed storage reservoir:

"Storm waters wash the sands from naked hills and mountains, and bear them on to the

creaks and rivers, by which they are carried to the storage basins."

Here the excellent Major describes torrent action, but he stops at the reservoir and does not descend his detritus-laden stream to the farms below. As soon as such a stream leaves the steep grades of the mountain it drops its load, fills its bed and changes its course. No one is safe in the bottom lands. I can show a number of instances of this sort of action in California alone.

But the most surprising part of Major Powell's article is his narration without a word of apology or regret—in fact rather proudly, of how he deliberately set fire to a giant pine tree in the forests of Colorado. He saw this fire mount and blaze and burn the tree; he saw it spread into the forest; he did nothing to stop it. He goes on to describe how grandly it burned and ends thus: "On its swept for miles and scores of miles, from day to day, until more timber was destroyed than has been used by the people of Colorado for the last ten years."

General principles are sufficient to condemn such a willful and wanton destruction of property, still more so of a property of which he as a Government officer was a trustee for the people. Besides this, however, his act was a violation of the laws of Colorado. If the crime had been committed here, he would have been punishable by both fine and imprisonment.

Arid Lands Irrigation.

In the May number of the *Century* is another article by Major Powell which this time says something about arid lands irrigation. The recommendations of the last article as to forestry with which pasturage is mixed up are diametrically opposed to the arguments of their utility in the first article. It sounds like the hedging of a political office-seeker without convictions. The whole composition is a jumble to which there is neither head nor tail. As one instance outside of forestry he recommends that irrigation work should be only undertaken by actual settlers in corporate combination. This sounds fine, but on the vast Mojave desert and on the wide and fiery stretches of the Colorado, there is no water. Settlers cannot come there and acquire lands without water, consequently corporate combination of settlers is an incompetent, because non-existent, agency in reclaiming these deserts. The settlers can only come after reclamation and cannot be a thing precedent to it. Herbert irrigation enterprises have been undertaken to enlarge small uses of streams by individuals in sections already habitable without these enterprises and by corporations, combinations or syndicates, controlling large bodies of land already as a rule productive for pasturage, if for nothing else—the inducement being the immense increase of production through irrigation. The conditions of the great Western deserts of Utah, Nevada, Arizona and Colorado, with which I am acquainted are different. Speaking generally, these vast desert areas are now incapable of producing any agricultural return to man. They are uninhabitable. The works necessary for their reclamation require grand storage and aqueduct works, entailing large expenditures of capital. Wisely undertaken, such works will undoubtedly prove as grand in their returns as they are grand in their conception. They must be undertaken by corporations or by the Government. The people will prefer the Government.

Major Powell's plan of non-existing and non-existent settlers undertaking such works is the conception of a political pander. The whole of this arid lands business seems to be in the wildest confusion. We now hear that the appropriation is to be spent in boring artesian wells in Dakota. The whole of Dakota that is capable under any conditions of sustaining humanity is already thus capable, after some sort of fashion. But this is not the case in the enormous areas of parched lands in the districts of the South. The soil here is exceedingly rich, and with water and the Southern sun gives immense returns to labor. Here exist the mountains with catobment basins, water-sheds and rainfall sufficient for a great portion of the country. It is here that the work should be done on the arid land irrigation, for it is here that not only the opening for snob work exists, but the conditions preclude the possibility of private enterprise accomplishing results.

Where other conditions exist, as in Dakota, etc., the Government had best limit its activity to preserving the mountain water-shed forests. The forests in all the arid and semi-arid region must be preserved if the region is to attain its highest development. The people will see and recognize this fact, no matter what pleadings special interests may set up to hide it.

ABBOT KINNEY.

Lamanda Park, Los Angeles Co.

RAILWAYS IN CHINA.—The extensive railway building some time ago contemplated in China is still held back by governmental opposition, but a short extension of the little road running to the Kaiping coal mines has been ordered to be made to the mines of Linai and the contract for rails has been let to a British firm. When China awakes and commences railway building in earnest, American manufacturers will be pretty sure to have a share of it.

ELECTRICITY IN ENGLAND.—It is well known that in the application of electricity, England is far behind America, but there are not wanting signs that the English are slowly but surely adopting electric light and power.

The Deep Gold Placers of California.

NUMBER X.—CONCLUDED.

[Written for the PRESS and Copyrighted 1890, by HENRY G. HANKS, F. G. S. A., F. G. S.]

Landslides.

The nature of landslides is indicated by the name, but it is not until they assume considerable proportions that they are so designated. An avalanche is a moving body of snow and ice. While it generally loosens earth and uproots trees in its course, it is not to be confounded with a landslide, which does not depend on snow for its motion. Landslides large and small, produce very considerable geological changes. The earthy matter after its transfer to a lower level is more easily washed away by water.

Landslides are very frequent in the Alps. The name "éboulement" or "éboulement de terre" has been applied to them, meaning a falling or sinking of the earth. Many instances have become historical, in which the summits or large portions of mountains have either fallen in mass into the valley below or have slid down an inclined plane of resistant rock.

In 1618, Mount Conto in Switzerland slid down and buried Pirra, a village containing 2430 inhabitants. The people carried on the manufacture of cooking-vessels of ollite, a variety of steatite or soapstone, in the quarrying of which the mountain was partly undermined. In 1714, a considerable portion of Mount Diableret fell into the valley, by which many lives were lost. The beds of several mountain torrents were filled and lakes thus formed; some streams changed their course. In 1751, a mountain near Servoz, in Savoy, fell, spreading ruin and death. The dust which rose is said to have darkened the air.

During an earthquake in Lugo county in September, 1868, boulders of large size rolled down the mountain-sides into the valleys. In Kings River Canyon the earth shook at short intervals for several days. During some of the earthquakes there were landslides and the downfall of large rock masses. The valley being uninhabited, no damage was done. A detailed account of these phenomena may be found in the Proceedings of the California Academy of Sciences, Vol. IV, fol. 33.

A landslide sometimes dams up the bed of a mountain torrent and causes the water to accumulate until, gaining strength and overcoming the barrier, it floods the valley below with sudden energy. A case of this nature occurred in Switzerland in 1818. Detached blocks from the Glacier de Getroz intercepted the flow of the east branch of the Dranse in the Val de Bagne, when a great lake was formed which finally burst its banks, and the rush of water caused landslides and widespread devastation.

There is a general tendency of elevated land to gravitate to a lower level, which seldom terminates in a landslide. I have for a number of years resided near the summit of one of the highest hills in San Francisco, during which time I have been engaged in a continual warfare against the slow movement of the ground toward the bay, and have noticed with dissatisfaction that the strongest cement walls I could construct would soon crack and ewerve from the perpendicular. This being repaired, the same would occur again, until becoming interested, I began a series of experiments which clearly proved that the whole hill is gradually wearing away and that it is only a matter of time when it will become obliterated.

Avalanches.

An avalanche is a large body of snow in rapid motion down a mountain declivity. Snow is not an avalanche before it commences to move, and ceases to be one when again at rest. When snow lies deeply on a steep incline, the attraction of gravitation maintains a steady pull upon it which for a time it resists, but with a greater accumulation, or when the masses become more yielding by change of temperature or falling rain, it is sometimes overcome and commences to move, slowly at first, but with accelerated velocity until it comes to a standstill in some valley far down the mountain-side.

When it starts from its first position, it is wholly snow, but as it descends it gathers rocks or detaches them; snaps off trunks of the largest trees—sweeping away whole forests in its course. When motion finally ceases, it is a mass of snow, ice, earth, rocks and broken trees in a state of the utmost confusion. It is at the commencement noiseless, but as it rushes along, a combination of sounds is heard which it is difficult to describe. The entire event does not occupy many minutes, in some cases only seconds of time, but its effects are on a grand scale.

In the Yosemite valley, which I visited in 1862 for the second time, I noticed many places where trees had been broken off in the wide path of numerous avalanches. These are as common in California as in Switzerland, and presumably so wherever high snowy mountains exist.

These eweeping snow and land slides do a great deal of geological work, and supplement the glaciers in mountain erosion.

Cloudburst Phenomena.

A cloudburst, or "waterspout" as it is sometimes called, is a sudden condensation of aqueous vapor on a mountain-side, generally

in an arid district. It cannot be likened to a heavy shower or thunder-storm.

The typical cloudburst generally if not invariably occurs during a period of intense heat or drought. The first indication is a distant and low sound of thunder. A mass of clouds, white if the sunlight falls on it, otherwise dark, moves rapidly toward the mountain, and sweeping up the side, settles on the summit. Immediately a great volume of water may be seen flowing toward the distant mesa. Seeking its level, it rushes with great impetuosity down any accidental natural canyon or one formed by a similar deluge in the past.

The flow is so violent that new channels are frequently cut in the loose sands whereby boulders and rock masses which lay hidden, are unnovered and even moved to a considerable distance down the grade.

While these gushes of water are infrequent when gauged by personal experience, in a geological sense they have been very numerous, for vast areas in arid California have been eroded by them. The effects they produce extend far beyond the point of condensation, for the flood follows channels until its force is expended, or until the water reaches a level plain, spreads out, and sinks in the thirsty sands of the desert.

When met in the canyons by travelers or prospectors who have no warning of the coming flood, the appearance is very alarming. The first intimation is a low but increasing roar, which is so well understood by the mountaineer that he at once seeks some elevated point beyond its reach. The increasing sound of its approach is followed by the sight of the water front, sometimes ten feet high and many yards broad, filling the entire channel. The boiling, rolling tide stirs up the dry sand in a strange manner. Debris of various kinds is pushed forward and rolled under the onrushing water front. Soon the channel has the appearance of a mountain torrent, but it quickly falls, and in a few hours the bed is again empty, and in two days is as dry as before, so that no evidence of the recent flood remains except some change in the bed, the placement of a few broken tree-trunks, or the changed position of isolated boulders.

To those who have no experience, the meeting of these floods is a circumstance of great danger, the more so as most of the roads and trails lead through canyons, the dry beds of former floods. Many instances of loss of life and property under such circumstances have been known and published.

Numerous mountain canyons in the desert part of the State have been cut and many times enlarged by a succession of cloudbursts extending over a period of centuries, and the tall which invariably spread, delta like, from the debouchure of each, are proof of this.

Blackhawk canyon, which lies on the eastern slope of the San Bernardino foothills, is a type of this class of erosion. Without a knowledge of cloudburst phenomena its origin would be to me inexplicable. The experience of a prospector as related to me by himself cannot fail to be interesting in this connection. The event occurred during the same season that I examined Blackhawk, and the locality was Rattlesnake canyon, only a few miles distant.

My informant camped in the canyon in mid-summer with his wife, his object being to explore and do assessment work on a mining claim. One torrid afternoon the ominous sound was heard, and being an experienced mountaineer, he quickly helped his companion up the rocky aide of the canyon to a higher elevation, and this not a moment too soon, for the flood rose nearly to their feet, while it swept away every movable object, including the entire camp and fixtures, and fell within a few hours, leaving the canyon dry as before. While it is certain that many similar floods have rushed down this canyon, no calculation can be made when another will do so. It may and probably will be many years. The talus at the mouth of Blackhawk canyon is composed principally of fragments of metamorphic limestone washed away from the immense calcareous cliffs which are exposed at this wonderful locality.

The duration of a cloudburst being so brief, rock fragments torn from their position and moved by it are never waterworn, and the blocks which compose the immense talus which skirt the base of the mountains in that portion of the State where this phenomenon is of frequent occurrence, are invariably angular, and the rocks, generally of a soft, yielding nature, are wholly unlike the rounded quartz boulders which result from glacial erosion.

Cloudbursts are not peculiar to California or the Pacific Coast, but are frequent in other countries. One of unusually destructive character recently occurred in China, and is thus described in the *Shanghai Mercury* of Jan. 7, 1890:

"On the 7th of this moon, in the Yangtse river near Nankio, at about 10 A. M., when the weather was bright, there was suddenly heard a rushing noise as of water, when two large black clouds appeared, and they soon enveloped everything like a thick fog. The two black clouds appeared to be fighting, at the sight of which the waters were much disturbed and the river was full of large waves. The two huge clouds eventually reached a place called Tsit Li-chow, when they burst asunder, making a very loud report. During the disturbance many boats were destroyed and over 100 people were drowned, and more than 50 were picked up in an exhausted condition by the Chinese Life-Preserving Association. Those who lost their lives were hurried by the

astherities. A long strip of the river-bank has also caved in."

We need not go far for examples of both landslides and avalanches, for the present winter has furnished the conditions to cause them on a grand scale in the Pacific Coast mountains. The following are extracts from local newspapers in which they are described:

"SAN JOSE, Santa Clara Co., Cal., Dec. 26, 1889.—The house of Jose Luis Mesa stood in the gulch at the foot of a long, steep ridge, about five miles east of Evergreen, and was occupied by Mesa, his wife and a child. The continuous rain of the last month and a half had loosened the surface of the whole mountain-side, however, and at about 11 o'clock a large mass of dirt, mud, rocks and boulders was loosened from a point on the hill fully a quarter of a mile above where the house of Mesa was situated. Gaining velocity at every turn, the slide sped on its mission of destruction and struck the house with great force. The house was crushed to pieces and the little girl carried some thirty yards from the spot, lodging against a tree and being covered with three or four feet of mud and rocks. By a miracle, apparently, Mesa and his wife escaped with their lives, but were terribly bruised by the mass of stones."

"DELTA, Shasta Co., Cal., Jan. 24, 1890.—There have been several large slides along the road. There is one at the north end of the tunnel, nine miles north of here. There is one of about 100 tons of rock and dirt and another large one a mile north of here. There is a slide reported south of here, making it impossible for trains to get to Sims with fuel or provisions."

"WALLACE (I. T.), Feb. 7, 1890.—The reports sent out from Coeur d'Alene city of a terrible accident at the Custer mine, were not exaggerated in the least. A snowslide occurred at 6 o'clock in the evening as 18 men were eating their dinner in the boarding house connected with the mine. The slide started at the top of the mountain about 300 feet above the boarding-house, and leveled every tree to the bottom of the gulch."

"The boarding-house was ground into splinters, six of the occupants being killed and as many more seriously wounded. Many slides are reported in all directions."

"Four men were buried in a slide in Canyon Creek gulch, but two of them escaped alive; the other two perished."

"The slides at Barke were more serious than we at first reported. Two buildings containing families were struck and carried clear across the gulch, but no one was killed. Several other unoccupied houses were wrecked, and most of the inhabitants of the town moved farther up the gulch where there was no danger from slides."

"About a mile and a half below town, a big slide occurred and struck a railroad camp, killing three men. At the Gem mine, the flume was carried away. The San Francisco tramway and a great portion of the flume was also destroyed. This side of Wallace, near the Argentine mine, a slide occurred, which buried the Coeur d'Alene narrow gauge and the Washington and Idaho tracks under 75 feet of snow. At Mullan, several slides occurred. No loss of life is reported, but the damage to property is great."

"At Wardner, the Emma and Last Chance mines tramways were carried away. The blacksmith's shop was destroyed and several other buildings wrecked, but no loss of life occurred."

"WEAVERVILLE, Trinity Co., Cal., Feb. 13, 1890.—Tidings were received last evening of a whole mountain's sliding on Dixon's Bar, 50 miles from Weaverville, Feb. 3, completely damming the Trinity river. Two Chinamen mining on the river were buried beneath the immense mass of earth, rock and trees."

"The river was running brimfull at the time, and the water backed up with frightful rapidity. A house, and barn filled with hay were swept away by the large volume of back water. The owner had just time to drive his stock to a place of safety and escape. Near San Juan Point the water came up to the front door of a residence 300 feet above the river, and a house two miles above was swept away with all its contents. The river backed up 12 miles and was dammed for seven hours, forming a vast lake. The water forced its way through, but as yet has not cut a sufficient channel. This is the largest slide recorded in Trinity county, and Weaverville people never heard of one in the State to equal it."

"SIERRA CITY, SIERRA Co., CAL., Jan. 3, 1890.—A snowslide came rushing down the hillside upon this city this afternoon, destroying the Roman Catholic church and several houses, carrying a number of others from their foundations, and causing the death of seven persons and possibly nine. The snow, which lay a dozen feet deep, started at the Sierra Butte flume, on the hillside above the town, and swept down with resistless force, carrying everything before it. Some almost miraculous escapes from death occurred."

"As soon as possible, the survivors began digging in the debris, and up to this writing seven bodies have been recovered. All is confusion at the scene of the accident, and it is impossible as yet to obtain any particulars, so sudden was the disaster. Many bodies may be buried in the mass of snow, logs, furniture and general wreckage."

"More slides are expected, and the people are in constant dread, but the snow is so deep that flight is impossible. All they can do is to wait and hope that the immense weight of snow

now hanging on the mountain-sides may not become loosened and complete this fearful work of destruction."

"SIERRA CITY, Jan. 4.—The fatal landslide occurred about 3 o'clock Friday afternoon. A body of snow fell from a bluff of rocks just below the Sierra Mune Company's flume at a point a quarter of a mile east of the center of Sierra City, and at an altitude of 1100 feet from the county road. The point of starting was at the head of a ravine in which the snow lay to a depth of from 25 to 30 feet. This started a slide in the ravine, which, hurrying down the side of the mountain, gained enormous volume and speed downward."

"The slide was what mountaineers term a 'lightning slide'—that is, the snow moves bodily down the mountain-side as distinguished from a hill-slide, in which the snow takes globular form and honnds downward as a ball would do. The slide followed the course of the ravine to a flat, leaping 100 feet at a bound over the county road, at which point the accumulated snow on the flat turned it, and it then made straight for the upper end of the town."

"A small hollow caused it to again turn, nearly at a right angle, and it then took its course right across the upper end of Bush's Flat. Several houses were instantly and completely raised. Not a timber was left standing, and the occupants of two were crushed to death."

"Those unacquainted with the action of snow on mountain-sides can hardly realize the awful swiftness and force of snowslides. The slide traveled a mile and a quarter in less than a minute. No warning was given and there was no chance of escape. Apparently all the victims were killed without time enough to move hand or foot."

"The entire village was thrown into a state of dread, and all the residents of the upper end of town immediately left their homes and came down to the hotels where less danger was felt."

"HOMER, Mono Co., Cal., Feb. 1, 1890.—Four months ago to-day the storm began, and with a few intermissions of an hour or two each, has raged with unprecedented violence ever since. Nothing like it was ever before experienced in these mountains, or any other that we know of. At least 50 feet of snow has fallen; in many places it is hundreds of feet in depth. The sides of the mountains are overloaded, and there is extreme danger from avalanches in every direction."

"Last Saturday the camp was in a high fever of fear. All day long snowslides were tumbling and thundering, bringing down immense masses of rock and timber and piling them up into grotesque and fantastic mounds, some of which were of huge dimensions. Everybody was nervously anxious, for disastrous results seemed imminent. The gloomiest anticipations prevailed. Both walls of the narrow canyon were covered with immense banks of snow ready to fall and entomb us, and no one place appeared to be more secure than another."

"In the morning, a terrific slide came down from a deep gorge on the northern flank of Mount Gilchrist. Starting from a point about 3000 feet above the town, it was augmented by slides from confluent canyons until its proportions were enormous and with accelerated velocity it barged down the precipitous hill like a flood of molten silver. When it struck the lake, there was a thundering crash of six-foot ice, followed instantly by cannon-like reports on the other side of the lake, as compressed air escaped from blowholes in the ice. Some of these vents, however, emitted sounds like the hoarse roar of a steam fog-horn."

"After a brief interval, another slide started from the southern escarpment of Mount Hector, on the other side of the lake. As it gathered material it accumulated speed, rolling over and over like breakers on a sloping shore and throwing feathery spray hundreds of yards ahead, until it shot out on the lake like a flash, and lay, an inert mass of glittering white, akin to a glacier in solidity. The sight was weirdly and appallingly grand, so startling in its magnificence that the few beholders were prompted to kneel in adoration. It is at once awful and sublime to see a large slice of earth in swift motion; but the sensation becomes one of abject fear when a person realizes the infinite danger that hovers in the track of one of these fascinating spectacles."

"The rain that falls on elevated lands does its humble work without notice, but in the aggregate it assumes enormous proportions."

"Constant freezing and thawing, and even long saturation by water, will disintegrate rocks, and especially soft slates and shales. This is observable near Laporte, Plumas county. Little piles of debris may be seen at the foot of all vertical banks thus loosened and caused to fall in miniature falls. Disintegration by frost has been studied in Greenland and is the admitted cause of considerable geological change in surface rocks."

"Denudation by saturation was illustrated in San Francisco during the recent unusually wet winter. On the hills in many places, rocks crumbled and fell from bluffs on the sides of newly graded streets."

"While I claim so much for local glacial erosion in California, I do not mean to belittle erosion produced by rivers and other forms of water in motion."

"Rivers not only erode deep channels but convey matter in suspension to localities far from their source. This is not only the case with rivers flowing with rapidity in mountain lands, but with great streams moving slowly on

plains. If a vessel is dipped into the Ganges at flood and the water allowed to stand undisturbed for a time, a deposit of sediment will fall which is equal to one-fourth its volume. The Yellow river in China conveys 2,000,000 cubic feet of sediment each hour."

"Aria, once the seaport which gave its name to the Adriatic, is now far inland. The delta of the Colorado in all probability filled a portion of the Gulf of California, which once extended over the now Colorado desert. The whole Sacramento valley is composed of debris from the mountains."

"Great rivers flow slowly, and unlike mountain torrents, the mineral matter they hold in suspension is extremely finely divided. The Ganges at 1800 miles from its mouth is only 800 feet above the sea level, and from that point the water is one month reaching the sea. The Rio del Plata flows so slowly that ships can sail up against the current for 1500 miles."

"Although this is the case, geological changes wrought by rivers are on a gigantic scale; these operations never cease. The Mississippi will eventually fill up the Gulf of Mexico, as did many other rivers, now dead, fill other gulfs now great deposits of sedimentary matter and dry land."

"Here a thoughtful mind sees evidence of design for the maintenance of animal and vegetable life. Were not this the case, vast numbers of beings now in the enjoyment of existence could never have lived."

"It is the order of nature that inorganic matter should precede and furnish food for vegetable forms, which in turn supply animal life with subsistence, and it is the ceaseless changes before referred to, that produce the necessary conditions."

"Malthus has shown that man can only live on the earth to the extent to which he can obtain food. If all organic matter was in use by living animals, no more life could be possible until a portion had paid the debt of nature."

"In the process of agriculture the fertility of the soil is being continually exhausted. To restore this, mountains and elevated lands are eroded by the forces we have considered, all of which thus take part in the economy of nature."

"The example of the Nile, which for many centuries has maintained the fertility of Egypt intact, is certainly worthy of consideration. The valley of this great river has been cultivated for 3000 years. The river commences to rise in June. The Nilometer at El Rodah indicates from 18 to 27 feet. If less than the former number, the overflow is considered scanty; the letter is good, but if exceeded, it is a destructive flood. The silt deposit is about 4 1/2 inches in a century."

"Diodorus Siculus thus describes the overflow of the Nile 2000 years ago, and relates the advantage taken of it by the ancient Egyptians:

"Book I, Chap. III: 'Mountains stand on both sides of the river, and the river forcing itself with great violence against strait and narrow precipices, the water is driven back and flows over the neighboring fields.'"

"This island" (the delta) "has in it many dikes and sluices cut by art, and is the most sweet and pleasant part of Egypt, for being enriched and watered by the river, it produces all kinds of grains and the other fruits, and by the yearly overflowing of the river the face of the ground is continually renewed and the inhabitants have an easy way to water it by a certain engine invented by Archimedes, the Syracusan, which from its form is called *Choclia*, and whereas the Nile flows gently over it and brings with it much soil, which, resting in low and hollow grounds, makes very rich marshes."

"The inundation begins in the summer solstise and increases until the equinoctial in autumn, during which time he hangs along with him new soil and waters, as well the tilled and new ground as that which lies waste and untilled, so long as it pleases the husbandman; for the waters flowing gently and by degree, they easily divert its course by casting up small banks of earth, and then, by opening a passage for it, as easily turn it over their land again if they see fit needful."

"It is so very advantageous to the inhabitant, and done with so little pain, that most of the country people turn their cattle into the sowed ground to eat and tread down the corn, and three or four months after they reap it."

"Some lightly run over the surface of the earth with a plow after the water is fallen, and gain a mighty crop without any great cost or pains."

"When other rivers about the solstise fall and grow lower all summer, this begins to increase and continues to rise every day until it comes to that height that it overflows all Egypt, and on the contrary in the same manner in the winter it falls by degrees until it wholly returns to its proper channel, and in regard the land of Egypt lies low and champion; the towns and country villages, that are built on rising ground, (cast up by art) look like the islands of the Cyclades."

"River silt is the best of all fertilizers, and here the idea occurs to me that perhaps the mode of leveling the rivers of California was a mistake."

"To confine the rivers within their low-water channels is to cause suspended fertility to flow into the seas and ocean, instead of being thinly spread over the bottom-lands to their benefit."

"Levees not only do not entirely prevent overflow, but when an unusual flood occurs, act as barriers to prevent the recession of the water after irrigation and fertilization have been accomplished."

"If there were no levees, the waters would not rise as high as now, and would quickly retire with the falling of the river. The sites of towns could be raised as that of Sacramento has been, and areas sufficiently elevated for farm buildings, as in Egypt, could be built and maintained at less cost, perhaps, than the present levee system."

"The miner does not consume the water he uses in his mining operations; if he did, there would be no complaint, or at least he would not send down the objectionable debris. When he has availed himself of the power created by the fall from one level to another, he practically returns it all to the head of the stream, from which it may be drawn by the irrigator below. The agriculturist has no surplus to return, and even while the population of the State is sparse, there is not sufficient water to supply the wants of all. With increasing numbers, conflicting interests will multiply, and the people of California find that the water question is far from being settled."

"It has been shown that erosion sets gold free and places it within the reach of man. We find the same forces applied in the interest of agriculture. Can we expect to reap this double advantage without drawback? Inasmuch as we cannot prevent the filling of river channels, lake-beds and inland bays by the forces of Nature, let us not overlook the prospective gain, but join hands in utilizing the natural resources of the State, both mineral and agricultural, without discord, or injustice to either interest."

"If some plan could be devised reconciling the interests of both farmer and miner so that the latter could increase the production of gold, it would greatly benefit the State."

"My study of the deep placers of California confirms my opinion that they are more extensive than generally supposed. I believe they can and will be worked on a much greater scale, and that as we become more familiar with their features and peculiarities we shall be able to discover others at localities now unknown."

"Drift mines are expensive to open and costly to work, but gold the world must and will have, as long as it is possible to obtain it, and as it becomes scarce and consequently more valuable, all difficulties will be overcome in the exploitation of the great natural treasures I have attempted to describe."

Mineral Exhibit for the World's Fair at Chicago.

EDITORS PRESS:—Having been, in connection with Prof. Henry G. Hanks, Mr. Melville Attwood and Sol Haydenfeldt, Jr., an active worker in getting up the California mineral exhibit for the World's Fair at Paris in 1878, I naturally, from this experience, have some ideas which may be turned to account for the coming Chicago World's Fair. To begin with, at the start there is always a great hurrah—there is plenty of money and plenty of help, until the money is wanted and the help means work. Then there is a general weakening all around. This fact we experienced; and when I say we, I mean the parties above named (including your humble servant) who did the work and made the success as far as the collection went; and even then all would have been a failure but for the generosity of John W. Mackay, who came forward with a check for \$5000—yes, \$5000.

"The point I am now aiming at is, if the mining counties do not take the matter of an exhibit in hand (each mining county for itself), the work will be but meagerly done and there will be general dissatisfaction."

"Now my proposition would be this: Let the representative mining men of each county organize World's Fair Committees, for the exposition of the mineral wealth of its respective county, and have no affiliation with any other industry. These County Committees can then form by representation a State Committee, who would see to the general business, as appropriation, etc., and see that the mining interest had its due (which it has not had for some years). Unless this is done, the mining interest will be left in the background. As to mining machinery, that can be passed over to the manufacturing interest, or be a matter for the State Committee."

"Another point I have to suggest is that where donations of minerals are made, there should be an understanding that the entire collection, at the end of the fair, be donated to the city of Chicago, they agreeing to place the collection on permanent exhibition in their public library or as they might see fit. By so doing, every county would be benefited for years after the fair was over."

"We certainly want to show, in profusion, the great value of the mining localities for every class of mineral—iron as well as gold, lead as well as silver. The fact of it is, Californians as a body do not clearly comprehend the value of our mineral wealth outside of gold, and we want to show it all. There is enough to do in this especial department without mixing it up with fruits, grains, pumpkins or potatoes. A State Mining Committee, having control of the entire exhibit, could command the situation and make a success of great value to the mining industry."

May, 1890.

ALMARIN B. PAUL.

"The Otay watch factory turned out its first assortment of time-pieces last Saturday. The event was celebrated by a free excursion to and from San Diego and a big banquet."

MINING SUMMARY.

The following is mostly condensed from journals published to the interior, in proximity to the mines mentioned.

CALIFORNIA.

El Dorado.

PROSPECTING FOR GRAVEL.—El Dorado *Republican*, May 31: Steps have been taken during the last week to prospect the extensive gravel ridge east of Placerville, a large part of which is owned by the Blair Brothers. This lava-capped ridge is known to contain in many places large deposits of auriferous gravel, which is probably the continuation of the old river channel which passes through Coon Hollow, Prospect Flat and Smith's Flat, and which has been very rich in many places. The Blair owns a tract $5\frac{1}{4}$ miles long on this ridge and the property has been bonded by a company which have made arrangements to prospect it by boring vertical holes through the cap on the ridge down to the gravel and bedrock underneath, which will require borings of 150 feet and upward in each instance. A. L. Perkins is in charge of the boring. The machinery to run the drills was sent up the ridge last Saturday, and it will soon be in operation by water-power from the El Dorado Canal. The first boring will be on the Painter Ranch. Considerable work has been done on the ridge by running tunnels and inclines without satisfactory results, as the gravel deposit is of unknown depth and extent, and not easily prospected in that way. The object of the boring is to ascertain the deepest parts of the channel and where gravel can be found, so that tunnels can afterward be run so as to drain the ground and develop it at once without the costly mistakes that have so often been made in other deep gravel mines by getting the opening tunnels too high. The borings will be four inches in diameter and will show the exact nature and depth of all the material on the ridge down to the bedrock.

Mariposa.

WHITLOCK MINES.—*News*, May 31: P. H. Breen's new find still shows good prospects and the discoverer thinks he has struck a valuable mine. Two young men by the name of Reed, from Coulterville, have opened up an extension on the Bull Dog lode and have a vein about three feet thick, which shows good milling ore. Work is progressing on the Grove & Ellingham mill. The battery frame is up, and the engine, rock-breaker and self-feeder in place. The water-tanks are in course of construction and the probability is that the mill will be completed inside of six weeks.

Nevada.

GOLD HILL MINE.—*Grass Valley Union*, May 30: The quiet that has so long reigned about the premises of the old Gold Hill mine has been changed to a scene of busy activity, preparatory to a resumption of underground work. Already a comfortable two-roomed building has been put up to be used as an office and storeroom, and necessary repairs to the hoisting and pumping works buildings are well under way. The position of the machinery is being changed for more convenience, and, where necessary, new bed-logs are being placed under the engines and hoisting gear. The carpenter work is being done by I. T. Walker, and James Burke is the mining foreman, having general supervision. No effort will be made to open the incline shaft until steam can be started up, which will take several weeks yet, as there is a good deal of surface work to be done before undertaking to open the shaft. The Gold Hill mine is historical, as upon that hill was the first discovery of gold quartz in California, and where the first regular quartz mining was instituted. Several millions of gold were taken out at that locality first and last, but the mine became apparently barren when it was worked to a depth of 350 feet, and for over 10 years it has been standing idle. Experience has shown that it will not do to say that a quartz mine has been worked out in this district when no greater depth than that has been reached, as such mining as that is but superficial. Deep working has given the best results, and the new company that has purchased the Gold Hill mine will exploit the property on that theory.

PEABODY.—The water is nearly out of the Peabody mine, and a track is being constructed for a dump, in readiness for the underground work which will soon commence.

Shasta.

IGO.—*Shasta Democrat*, May 28: Whit George and Doc Dunham of Igo came in Monday from their mine on Muleton mountain, bringing with them a large sample of ore from the mine. They have developed this mine sufficiently to prove that it is a valuable piece of property. The ore is very heavy in sulphurets and when concentrated assays about \$500 a ton. They have been working some of the ore in a small arrastra and amalgamate about \$50 a ton.

LOWER SPRINGS.—*Cor. Democrat*, May 28: The Beecher property is fast coming to the front. Their tunnel is advanced in the mountain, running west about 240 feet, and have had good ore from the point of tapping the ledge. I learn from good authority that the breast of their tunnel running west is in far better ore than yet discovered in any part of their mine. They have also commenced an upraise to connect with the shaft so as to afford them abundance of air. This mine has good ore in every place of working, and we congratulate them for their energy and hope they will be rewarded double fold for labor. The St. Auburn, Ed Sweeney's mine on Clear creek, is fast becoming a valuable piece of property. I was informed by Peal & Rice, part owners, that their prospect is way up, the best they know of. The Mountain View M. Co. is still advancing their tunnel toward the old shaft where there is still considerable good ore in sight and they intend to run a tunnel still beyond the shaft toward the summit of the hill, where they expect crosscutting for other valuable ledges. The Walton mine on Salt creek is going to start up soon. Jim Hill is bent on starting a tunnel on Salt creek and run west in order to tap the Keystone mine, which is so well known for its ore produced. There is some talk of the Deakin & Taylor group of mines starting up. This is the best piece of mining property in this district and ought not to lie idle.

Sierra.

RIVER CLAIM.—*Mountain Messenger*, May 31: Oscar Jones has gone to work about five miles up the North Fork, to open the river claim of P. Lorenson,

There is supposed to be quite a stretch of the old river channel there which was covered by a slide, which has never been worked owing to its being below drainage.

LONE STAR.—Mr. Snyder, of the Lone Star mine, has sent up men to prepare for operating this summer after the snow has melted around Gold Valley. **THE MOUNTAIN MINE.**—*Tribune*, May 30: Richard Harper arrived here yesterday from S. F., accompanied by Mr. Hancock of London. Work will be commenced at the Mountain mine just as soon as practicable under the able management of Mr. Harper. Mr. Hancock will have charge of the accounts, pay department, etc.

Trinity.

TRINITY CENTER.—*Shasta Democrat*, May 28: Gerald O'Shea of Trinity Center arrived in town Sunday evening via Lewiston, bringing with him some handsome specimens of free gold croppings from the new gold mines northeast of the Altona quicksilver mines. He says there is plenty more yet on the mountain ranges in the northern part of Trinity.

HYDRAULIC MINES.—Louis Raab of Douglas City reports his section of Trinity county prosperous—particularly the hydraulic miners. They will make the biggest cleanup this season that they have made in years; the result of plenty of water, which insures a long season's work. The new mining camp on Canyon creek is booming and is alive with hardy prospectors. Several new and valuable mines were discovered in the new camp within the past six months, which have attracted a great number of miners to the new district. The quartz there is rich in free gold and the veins average good size.

A NEW STRIKE.—*Weaverville Journal*, May 31: T. J. Blakemore was in town this week and informs us that Harvey Springsted discovered a new ledge last March on the Daisy mine location above Lewiston. The ledge averages about two feet in width, carries free gold and prospects well. It is good milling rock. The ledge shows up well for the amount of work done upon it and Mr. Blakemore, who is interested in it, thinks it will prove a good thing.

HETTENSCHAW QUARTZ.—There is some prospect of Hettenschaw's becoming a quartz camp. Mr. Willburn informs us that eight men have been put to work in developing the ledge found last year on Big Rock creek, and that more men are wanted. The ledge is within four miles of Hettenschaw valley and has been traced for eight miles. The parties who have charge of the mine are moneyed men and intend working the ledge for everything there is in it this season.

DEADWOOD.—The past two weeks of warm weather is shortening our supply of water to prospect on the high ridges. There have been no big strikes in camp of late, although we hear that Kline & Co. have a very flattering prospect on the Bismarck mine which we hope may increase as the development goes on. Manuel Enos & Co. are getting a very good prospect on the Wm. Lappin claim. Every one seems to be getting over the effects of the hard winter and doing better than ever.

Tuolumne.

HYDE MINE.—*Sonora Democrat*, May 30: Jack Hammond, the efficient engineer of the Hyde mine, started up the pumps on that mine Tuesday. Work will now be vigorously prosecuted.

BLACK OAK MINE.—The pumps on this mine are in active operation, and other necessary preparations are being made for the future working of the mine. As soon as the mine is freed from water, a large force of men will be put on, and the stamps will sing merrily, as before, crushing high-grade ore.

THE CARRA MINE.—This mine, situated near Soulsbyville, between the Live Oak and Black Oak mines, is looking well. Mr. A. F. Cooper, the owner, is making rapid developments on the mine, which is on the same lode as the Black Oak. The ore yields \$30 per ton in free gold and over \$500 per ton in sulphurets.

SAN GUISeppe.—This mine is being thoroughly prospected—something never done before—under the able management of Supt. Whorf, and will be in a well-developed state before long. The parties having the mine at present will make every examination possible into the merits and demerits of the property before completing the purchase thereof. The vein is now 10 inches in diameter, and has been varying between 10 and 14 inches for the past three months. The similarity between the ore of this mine and that of the Golden Gate is so great that no difference can be noticed when placed side by side, yet the ore from the Guiseppe contains three times as much gold as that from the Golden Gate. The sulphurets are fabulously rich, and are treated at the Malmgren Reduction Works. Eight men are employed in the mine.

NEVADA.

Washoe District.

ORE AND BULLION YIELD.—*Virginia Chronicle*, May 31: This week's ore yield of Comstock mines aggregated 6485 tons, divided as follows: Con. Cal. & Va., 2407 tons, assay value \$23.25 per ton; Savage, 505 tons, assay value \$22 per ton; Hale & Norcross, 1125 tons, assay value \$18.50; Yellow Jacket, 570 tons, assay value \$21; Crown Point, 610 tons, assay value \$22; Justice, 200 tons, assay value \$27.13; Alta, 350 tons, assay value \$22.75; Overman, 260 tons, assay value \$23.75; Chollar, 449 tons, assay value \$21.32. Following was the bullion yield of the ore product from each of the above mines, estimated on the probability that 80 per cent of the value of battery sample ore pulp assays was returned: Con. Cal. & Va., \$45,000; Savage, \$8888; Hale & Norcross, \$17,000; Chollar, \$9563; Yellow Jacket, \$9600; Crown Point, \$17,000; Overman, \$4850; Alta, \$6200; Justice, \$4200; total, \$176,301.

SIERRA NEVADA.—On the 630 level a southwest drift is advanced 665 feet from the shaft station and is discontinued. At a point in this drift 600 feet from the shaft station, a west crosscut is advanced 47 feet, the face in porphyry.

UNION CON.—On the 1465 level from the north lateral drift, opposite west crosscut No. 4, east crosscut No. 1 is advanced 422 feet. Repairs to the north lateral drift in progress.

MEXICAN.—On the 1465 level at a point 70 feet south from west crosscut No. 4, west crosscut No. 5 is advanced 75 feet in porphyry carrying quartz showing value.

OPHIR.—On the 1300 level in drifting southwest from the top of the raise carried up 28 feet

above the south drift from the end of the east crosscut from the shaft station, the ore streak followed in that direction has changed into quartz of low value.

CON. CALIFORNIA & VIRGINIA.—The 1300 and 1500 levels continue to yield the usual quantity of ore. Shipped to the Morgan mill 1092 tons of ore and to the Eureka 1419 tons; battery sample assays showing an average value of \$23.25 per ton; 2407 tons milled. Bullion valued at \$13,106.73 shipped to the Carson Mint, and about \$62,000 on hand in local assay office.

SCORPION.—The southwest drift from the 630 level shaft station is advanced 610 feet and continues in porphyry.

ANDES.—A 420 level west crosscut 160 feet north of the shaft is in 42 feet. The face is in low-grade quartz. The 350 level west crosscut is extended 245 feet, the face still in porphyry.

SAVAGE.—Shipped 505 tons of ore, showing an average value of \$22 by battery sample assays. Nothing new in 300 level explorations.

HALE & NORCROSS.—A 1300 level north line east crosscut is in 45 feet, showing porphyry and low-grade quartz. Shipped 1125 tons of ore during the week, showing an average value of \$18.50 per ton by battery sample assays.

WARD COMBINATION SHAFT.—The 1800 level, east drift is out 395 feet; the face continues in porphyry.

CHOLLAR.—Extracted 449 tons of ore, battery sample assays showing a value of \$21.32 per ton.

POTOSI.—On the 930 level the winze is down 134 feet, the bottom principally in quartz giving low assays. Sinking the winze is suspended pending the setting up of a hoist plant at the top.

ALPHA.—The 600 level west crosscut is in 165 feet, the face in quartz.

EXCHEQUER.—The 500 level north line east crosscut is in 210 feet, and continues in quartz and porphyry.

CON. NEW YORK.—The north drift from the top of the raise above the 800 level is out 35 feet, the face in low-grade quartz.

SILVER HILL.—The east drift from the winze below the 800 level is out 75 feet, the face showing bunches of fair-grade quartz.

IMPERIAL.—The joint Challenge-Confidence 1000 level north drift is out 222 feet from the north line of the South Challenge, the face in porphyry. The 750 level west crosscut No. 3 is in 145 feet, the face in quartz and porphyry.

YELLOW JACKET.—Shipped 570 tons of ore showing average assay value of \$21 by battery sample assays.

CROWN POINT.—Shipped during the week 610 tons of ore, showing an average value of \$20.52 per ton by pulp assays. A west drift from the 400 level raise is out 52 feet. Ore shipments suspended on account of high water in the Carson river flooding the mills.

CONFIDENCE & CHALLENGE.—The joint Imperial 1000 level west crosscut No. 2 is in 266 feet, the face in vein matter and the bottom in ore. The joint Imperial raise above the 700 level north drift is in low-grade quartz. West crosscut No. 2, same level, is in 103 feet; the face continues in low-grade quartz.

BELCHER.—The 200 level west crosscut has reached the west wall. Have started a north drift following the vein. The 850 level joint east crosscut is out 483 feet, the face still in soft porphyry and clay. A 200 level west crosscut No. 3 is being advanced to cut the continuation of the Crown Point 300 level stop. The 1300 level east crosscut is in 30 feet in low-grade quartz.

SEG. BELCHER.—The 800 level west crosscut is in 45 feet, the face in porphyry and quartz.

JUSTICE.—During the week crushed 200 tons of ore showing a value of \$27.13 per ton by battery sample assays. The raise above the 622 level continues in low-grade quartz. The bottom of the winze below this level is still in good ore.

ALTA.—The ore output this week was 350 tons, showing an average assay value of \$22.75 per ton by pulp assays.

OVERMAN.—Shipped 260 tons of ore during the week, showing an average value of \$23.25 per ton by battery sample assays. The northwest drift continues in low-grade quartz. The incline winze is down 46 feet below the 1200 level, ore still showing in the bottom.

UTAH.—On the 725 level west drift is advanced 252 feet from the shaft. At a point 225 feet west of the shaft a south drift is advanced 80 feet, the face in vein porphyry and quartz.

OCCIDENTAL CON.—Continue to extract ore of good quality from the stopes on the 400 and 450 levels. In the 550 level north line west crosscut the winze is down 27 feet, the bottom showing bunches of good ore. The 550 level north line crosscut has been stopped until better ventilation is secured. The 650 level main north drift is extended 106 feet, showing low-grade quartz.

NORTH OCCIDENTAL.—Work confined to repairs.

BEST & BELCHER.—On the 1200 level, at a point in the north drift 410 feet from the shaft, west crosscut No. 2 is cleaned out and repaired 20 feet.

GOULD & CURRY.—On the 200 level the south drift from west crosscut No. 1 is extended 85 feet. Formation, porphyry with streaks of quartz.

Eureka District.

A NEW MINING DEAL.—*Sentinel*, May 31: An arrangement is pending between Prospect Mountain Tunnel Co., and the owners of the Silver Connor mine to connect the mine with the tunnel. The tunnel has an upraise in the direction of the Silver Connor several hundred feet in length. From the head of this upraise to the lowest workings of the Silver Connor mine is a distance of 350 feet. The running of this 350 feet is all that has to be done to give the mine the advantage of working through the tunnel. It is thought that an arrangement can be perfected at an early day whereby the two properties will be mutually advantageous to each other. If a satisfactory consolidation of the two properties cannot be brought about, then an understanding on the basis of a royalty for the use of the tunnel is believed to be practicable. In any event the parties are earnestly negotiating, and it is more than probable that an agreement will be speedily reached. The Silver Connor, which is already a mine of established value, can be worked to a depth of 1200 feet through the tunnel. With the pending deal consummated, another good and paying property of very considerable magnitude will be added to our list of bullion producers.

ORE SHIPMENTS.—There were 555 tons of ore shipped over the E. & P. railroad during the week.

During this month the shipments to Salt Lake have aggregated 2000 tons.

Freiburg District.

PROSPECTS.—White Pine *News*, May 31: P. N. Hansen, who has been out at Freiburg for the past two years developing the mines of that district, was in town several days this week. Freiburg is about 125 miles south of here, and was prospected and worked years ago by C. C. Goodwin, now of the Salt Lake *Tribune*. The surveys of the western extension of the Union Pacific railroad run within one mile of the mines, and when the road reaches there, Freiburg is sure to become one of the most prosperous mining camps in the State. While the ores are mostly low grade, the deposits are large and contain just the necessary fluxes for smelting. The ores are carbonate found in porphyry between quartz and limestone, and average from 30 to 50 ounces in silver per ton and 40 to 50 per cent in lead. There is now on the dumps from the several mines from 1500 to 1800 tons of ore that will average the figures stated, besides any quantity of the same kind in sight ready for extraction. George Ernst of Belmont has also some promising mines there, the richest being the Shonti, which goes from 200 to 800 ounces in silver and 40 per cent in lead. Considerable ore has been shipped from this mine. Though the country is generally very dry, Mr. Hansen tells us he ran a tunnel this winter 300 feet in porphyry and got a fine stream of water, sufficient for all the needs of the camp.

Pioche District.

THE YUBA.—*Pioche Record*, May 28: Having been tendered an invitation by Supt. Sam Godbe to visit the underground workings of the Yuba, we repaired to the tunnel level of the mine, some 300 feet from the surface, and accompanied our guide some 60 feet east of the shaft, until the flickering rays of our candles brought to view 4 feet 2 inches, actual measurement, of ore, that we were informed averaged 60 oz. silver, 25 per cent lead and $\frac{1}{4}$ oz. gold. From our knowledge of the general characteristics of the Yuba ore, we have no reason to doubt the authenticity of the figures. Having satisfied our curiosity in regard to the 8th level, we dropped down to the 830 where the ledge is smaller, but richer, 2 feet of ore being in sight that averages 300 oz. in silver and 50 per cent lead. The ore at this point is clean, having a dark glossy appearance which resembles black metal. We next visited the 9th level where the ore has undergone a change, it being free-milling quartz, the ledge being 5 feet between walls. Mr. Lloyd places the average of this ore at 50 oz. per ton. From the 9th to the 10th levels we noticed another change in the character of the ore body, the ledge the greater part of the distance being 10 feet in width, the ore being zinc blende and galena that assays from 30 to 80 oz. per ton and carries 25 per cent lead. From the 10th to the 11th the same character of ore is encountered, the ledge, however, being smaller, 4 feet being about an average. We examined the ledge at our leisure between the 11th and 12th levels, where considerable work has been done, and found it to average 4 feet, more than half of it being free smelting, and the remainder good concentrating ore. The clean smelting ore averages 130 oz. silver and 50 per cent lead, and the concentrating 25 oz. in silver and 20 per cent lead. We next visited the 13th level, which is the deepest point in the mine, and from where a prospecting drift of 110 feet has been completed to cut the ledge; the vein matter when uncovered at this point did not show much, but after drifting 25 feet the same chimney of free smelting ore that is exposed on the 12th was encountered, average samples from 2 feet assaying 100 oz. silver and 30 per cent lead. At this writing the hanging-wall has not been reached at this point.

ARIZONA.

JOHNNIE BULL.—*Tomahstone Prospector*, May 28: William Henry of Stein's Pass made a very rich strike last week in the Johnnie Bull mine, which he has been working. At a depth of 264 feet a blind ledge was encountered running at right angles to the copper vein on which he was sinking. The ledge is five feet wide, and is what is known as sand carbonates. An average of the ore was taken to N. W. York by Mr. Henry, who wrote back to a friend that the ore would go 82 ounces silver and carried 40 per cent lead. Mr. Henry is backed by ample capital, and will erect extensive concentrating works between the mine and Galeville. The latter point is but 12 miles from the Johnnie Bull, and there is an abundance of water between the two points. G. H. Montgomery of the Chiricahua mountains, whose ranch and mining interests are below Galeville, is in town and reports some activity in mining matters in that locality. A New York company is working the Texas mine, and on the 17th of the present month struck the ledge in the face of a tunnel at a depth of 250 feet. They are into the ledge over ten feet, and there is no sign of the hanging-wall as yet. Mr. Miller of the Rhode Island Co. is working a small number of men and is taking out good ore.

SILVER.—*Silver Belt*, May 26: The total bullion shipments by the Fame Silver Mining Co., from ore recently worked at the Centennial mill, were 15 bars weighing 1785 pounds or about 26,000 ounces. The Fame is maintaining its reputation as one of the best silver mines in Arizona.

COLORADO.

STRIKE IN THE O. K.—*Aspen Times*, May 29: Manager C. W. Ellis of the O. K., is just now highly pleased over a new discovery in that property. The O. K. has been a producer of small quantities of ore for a long time, but until within a few days, nothing has been found that looks like a big strike. Now, however, there is a face of ore showing that promises to make the property a payer of large dividends. Mr. Ellis has been at work for some time and has just opened what appears to be a continuation of the main ore-chute of the Dollar. He finds it at a point that is a little above and some 40 or 50 feet south of the drift that reaches across the Dollar, connecting the O. K. with the Justice incline. He is running a level that is about 10 feet east of his west side line, and in this he struck ore a few days ago. It had opened out Monday until it was shown to be six or seven feet thick. A portion of it ran over 100 ounces per ton and all averaged up close to 60 ounces. He has every reason to believe that

this will prove to be one of the big strikes of the Park, as the ore-chute has been followed far enough in the Dollar to show that it is continuous and that it is probably as rich where it crosses into the O. K. as where it has been developed.

COKE OVENS.—Elk Mountain *Pilot*, May 28: Work will be commenced at once on the erection of 30 new coke ovens by the C. G. & I. Co., in this town. General Supt. S. S. Ramsey was here yesterday, accompanied by his wife, J. J. Rickard of Greensburg, Pa., who will have the contract to build the ovens, was also here looking over the ground. Also in the party were A. C. Weimer, S. G. Rickard and J. D. Best, all old friends of Mr. Ramsey from Greensburg, Pa.

BRITISH COLUMBIA.

GOOD NEWS FOR MINERS.—Kamloops *Sentinel*, May 31: We are glad to learn that the Provincial Government has made arrangements by which the payment of \$105 required on the location of a mineral claim within the railway belt, will not be exacted until after the locatee shall have proved his lodge and applied for his crown grant. This removes a serious obstacle in the way of prospecting within that Territory. The question was agitating the public mind while the Premier was visiting Kootenay last week, and was the principal subject of discussion. The prompt action of the Government in having the grievance complained of removed will be fully appreciated by the miners.

DAKOTA.

IRON HILL.—Deadwood *Pioneer*, May 31: Two wagons heavily laden with silver bullion came in from the Iron Hill smelter yesterday, and unloaded at the First National bank. There is now at the bank 288 bars, weighing about 13 tons. Several tons have already been hauled to Whitewood and several hundred bars are still at the smelter, which is still in blast.

IDAHO.

STRIKE.—Idaho *World*, May 31: A rich strike has been made in the Pride of Idaho mine, about one-fourth of a mile above the Elkhorn. Hugh Turner a few years ago made a big cleanup from ore from this mine, and if the rich ore continues coming out as rapidly as it is now, some big cleanups will be made this year. There are several very rich mines in the Elkhorn district that should have mills on them; but as most of them are in the hands of prospectors, we cannot expect to see new mills go up until the money is made out of the mines or they pass into the hands of men with sufficient means to go ahead and not be afraid to push work. Three or four of them are now owned by a Boston company that seems to be waiting for them to take fresh root and grow.

A TUNNEL SCHEME.—Silver City *Avalanche*, May 31: Since the early days of this camp, the idea has been advanced that a tunnel commencing in the south branch of Sinker creek, about one mile east of War Eagle mountain, and run in a northwesterly direction, would strike the mines of that mountain at a depth of about 1500 feet. It is now proposed to do this. The tunnel will be commenced at a point in South Sinker, a mile due southeast of the Minnesota mine, and will be run that distance in a northwest direction. It will be seven feet high and six feet wide in the clear, with a drain race in the bottom four feet wide and three feet deep. The tunnel will be run with Burleigh drills, with electric-power, which will be supplied by a very large dynamo, run by water-power part of the year and by steam-power the balance of the time. It is also intended to supply Silver City with lights, by wire run from the dynamo to town. It is estimated that the tunnel can be run to cut War Eagle mountain at the depth mentioned for about \$155,000, but to make success doubly sure, a working capital of \$225,000 will be raised, which it is thought will extend the tunnel still farther into the mountain than is now contemplated to do. It is expected that the tunnel will be completed within two years at most. The object of prosecuting this enterprise is to work the lodes already discovered, and to find new ones. When the lodes on the Oro Fino line shall have been cut, drifts will be commenced by the owners of those mines, ore extracted and run into a large mill, which will be erected near the mouth of the tunnel, and for the erection of which capital will be raised, and the mill erected by the time the lodes are cut. This mill will be erected below the tunnel about 300 feet, and will be run the year round by water from the south fork of Sinker creek, and the four-foot drain in the tunnel, by means of Pelton wheels. The estimated amount of ore expected to be milled before the lode first cut is exhausted is about 2,000,000 tons. The tunnel company will charge for running the ore out of the tunnel to the mill, a royalty of \$2 per ton, so that the ore will cost the owners of the mines above mentioned that price for delivery at the mill. The company will then pay all wear and tear of machinery in working the same. Of course the mine-owners will have to mine the ores, so that the tunnel company will be at no expense other than running the ore to the mill. By this manner of mining it is thought that the mine-owners will mine and mill their ores at a cost of not more than \$7 per ton, which will leave them a very handsome profit.

QUARTZ.—*Avalanche*, May 30: The discovery of a quartz lode was made by Mr. J. F. Sullivan during the week nearly a mile beyond the summit of Long Gulch, which looks well. He has not yet had time to prospect the lode, but so far as developed it is about six feet wide. This is a new district or section in which no lodes have been heretofore found and may lead to the discovery of other lodes of great value.

PLACERS.—It is rumored around town that rich placer diggings have been found in the immediate vicinity of Quicksilver mountain in this county. That gold has been found in that section there can be little doubt, as in the early days of this camp some was washed out. Whether there are any extensive gold fields so near home is a question yet to be determined, but from our knowledge of the country, gained from old prospectors, we are inclined to say no.

BLACK JACK.—Supt. E. H. Dewey informs us that the crosscut to cut the Black Jack and Empire State mines is in very hard ground, but that he hopes soon to have the air compressor in, when better

headway will be made. He has had a good wagon-road constructed on the hillside up Blue gulch to the tunnel, over which all supplies will be hauled to the crosscut or tunnel.

LOWER CALIFORNIA.

SAN DAVID.—The original location on this vein showed a heavy outcrop of low-grade ore. Recently a parallel vein was struck which has given the claim great value. The new discovery has been opened on the croppings for 200 feet, to a depth of 12 feet, and 150 tons of ore extracted that pays not less than \$20 per ton. Unfortunately, like other good veins, it is hindered from sinking deeper by water unless sufficient pumping capacity is provided. About twenty men are at work stripping the ledge and sinking shafts. The vein for its full length will average twenty inches wide.

TELEMACO.—The shaft, 65 feet deep, is on the 70 degree incline of the ledge, dipping south. The mine has shown a bold outcrop, having ore in places eight feet thick. It will average four feet thick for 100 feet in length. The ore is laminated in character, showing a large amount of oxide of iron and free gold, and very rich decomposed quartz in seams. Supt. Rodda is now at work putting up a substantial hoisting works and steam pump to drain the mine.

PENLOPE.—A contract for sinking an almost vertical shaft of 70 feet was completed last week. A crosscut in the bottom shows a ledge four feet thick. By far the greater part of custom ore in camp is milled by Col. Lane. His mill was repaired and started running on the 9th, and for the week ending the 16th Col. Lane reports the amount of custom ore worked as 69 tons, 718 pounds, yielding 148 oz., 9 dwt. of retorted gold, valued at \$2069. This makes an average of over \$42 per ton. The ten-stamp El Paso mill is kept running night and day on Elsinore rock. The Torres Co. has been reorganized under the name of the Santa Clara Mining and Milling Co., composed of Messrs. H. M. Russell, Thos. Rhodes and H. Edwin Moore. Their five-stamp mill will be started next week. All the mines being worked by private parties and smaller companies are doing well and lots of gold is being taken out.

ALAMO.—Cor. *Lower Californian*, May 29: Directly and indirectly the Princessa and Colonization Companies have 150 men in their employ, almost half of whom are tributaries, who seem satisfied with the conditions of contracts and leases, and are making money. The company's mill is Huntington's patent centrifugal, working 14 tons per day. On this class of ore the mill does very good work and is kept steadily running, although the ore is now charged with sulphurets; and I should think it advisable to concentrate the sulphurets now being piled in tailings. The Princessa Co., Limited, incorporated with eight mines—the Princessa, Cocino, Ulises, San David, Gragdisima, Moran, Iron Mask and Spider. The principal ones worked are the Princessa, Ulises and San David. Assessment work only has been done on the rest. The Colonization Co. is working nine mines, of which the Telemaco and Penelope are chief. The others are merely prospects.

ULISES.—The shaft is 100 feet deep, and a crosscut was started in the bottom, but had not struck the ledge in December, when the overflow of water overcame the steam pump. The company now proposes to erect powerful machinery on this shaft, the largest steam pump in camp being now on the ground. The vein at the bottom of the Indian shaft is one foot thick in well-defined walls and pays \$50 per ton.

MONTANA.

BOULDER NOTES.—*Age*, May 31: Another rich strike is reported in the Hiawatha mine, Cataract district. A carload of ore from the Mollie McGreggor mine went to Helena the past week by the Northern Pacific road. Messrs. Hight, Fairfield & Honaker are taking up the bond on the Obelisk mine of Jo McNally, near Basin. Eight bars of Holter bullion came down from Elkhorn the past week for shipment East by the Northern Pacific Express Co. Mining properties in the Amazon district continue to improve and there is every probability that the district will shortly become one of the most noted in the country.

NEW MEXICO.

CONCENTRATES.—*Western Liberal*, May 28: The Standard Mutual shipped a carload of ore and a carload of concentrates to the O. Ford Copper Co. of New York this week. J. W. Hughes of St. Louis was in town Monday en route from Clifton to Gila Bend. Mr. Hughes was in Clifton to expert the Ingram group of mines in Gold gulch, on which he has bond which has about 4½ months to run. Mr. Hughes is very much pleased with the looks of the property and thinks he will have a rare bargain.

OREGON.

RICH GOLD SPECIMENS.—Bedrock *Democrat*, May 22: At the First National Bank Cashier Parker has placed on exhibition a display of gold product specimens of rare beauty and richness, the product of the mines of Baker county. Here will be seen numerous specimens from the Virginia mine of Robinsonville, 40 miles southeast of the city, the richest discovery of gold ore ever found in the Northwest. From this mine with a hand mortar alone upward of \$10,000 has been taken out. Specimens from the famous Connor Creek mines are also to be seen, and last but not least the gold nugget of the value of \$420 picked up on May 13th in the Boreman placers eight miles east of the city, attracts the eye of all lovers of the beautiful.

UTAH.

THE SOLID MULDOON.—Eureka *Chief*, May 30: Some nice-looking quartz from the bottom of the Solid Muldoon shaft was hoisted Tuesday. It will probably assay way up. Col. T. P. Murray of the Murray Hill Mining Co., which has a bond on this and other claims, the property of Capt. H. D. prezin, came down Monday, and is jubilant over the appearance of the prospect. He took some of the quartz in to the city for assay. The shaft is being sunk rapidly, and the operators feel confident that they are very close to a large body of ore.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING MAY 27, 1890.

- 428,730.—WINDOW VENTILATOR—P. Abrahamson, S. F.
428,587.—HYDROCARBON BURNER—Avery & Smith, San Diego, Cal.
428,588.—TIME-PIECE DIAL—W. W. Bartram, Portland, Me.
428,829.—HYDRAULIC MOTOR—H. P. Christiansen, Oakland, Cal.
428,898.—BRIDLE—G. T. Duncan, Tacoma, Wash.
429,026.—CAR-COUPLING—F. A. Fox, S. F.
428,673.—CANDLESTICK—Gavin & Cromer, Eureka, Cal.
428,750.—COIN ACTUATED ATTACHMENT FOR PHONOGRAPHS—Glass & Arnold, S. F.
428,751.—COIN ACTUATED ATTACHMENT FOR PHONOGRAPHS—Glass & Arnold, S. F.
428,840.—CRATE—G. T. Hall, Monrovia, Cal.
428,777.—GATE—F. J. Johnston, Sacramento, Cal.
428,757.—RAILWAY RAIL JOINT—Jos. P. Kelly, S. F.
428,733.—SPIKE-MAKING MECHANISM—S. Uren, Sacramento, Cal.
428,986.—OVERFLOW SLOP-HOPPER—E. W. Williams, S. F.
428,708.—SPREADER FOR DRAFT CHAINS—S. P. & E. Windsor, Madison, Cal.

The following brief list by telegraph, for June 3, will appear more complete on receipt of mail advices:

California—Percy Beaulieu, S. F., carpet-fastener; Henry A. Bond, Los Angeles, turfed head rest; Joseph Davy, Oakland, and J. T. Dufan, S. F., box-fastener; George E. Day and E. H. Cole, S. F., wave-force pump; Charles N. Earl, Los Angeles, sand-box for water conduits; Charles W. Elkins, Palermo, and W. C. and S. Foreman, Hildwell's Bar, fruit-pitting machine; James I. Kingeard, S. F., portable windlass; Joel B. Low, S. F., railway car; Willard F. Nightingale, Latrobe, axle set; Owen T. Owens, S. F., assignor to Benilda Agricultural Works, Benilda, draft and haul gauge for plows; Lucinda M. Piersan, Goleta, remedy for ulcers; Mary E. Thraut, Riverside, clo-hespin; Andrew S. Wadleigh, S. F., can-head cutter. Washington—Nels Nelson, assignor of one-half to J. J. Weatherway, Aberdeen, snap-hook. Oregon—Benjamin F. Fuller, McMinnville, clothes-drier.

Notes.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast, inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

SPIKE-MAKING MECHANISM.—Stephen Uren, Sacramento. No. 428,733. Dated May 27, 1890. This invention relates to that class of spike-making machinery in which the bar is clamped sidewise, resting upon a suitable die, and its tapering point is made by the action of a small wheel or roller which hears down upon it. The invention is properly an attachment to a bolt-heading machine, as it has been adapted to be applied readily to such a machine, using the power-transmitting devices and operative parts, such as the frame and plunger and gage of said machine, to effect similar operations in connection with the operations of the spike-making attachment. The subject of spike-making has lately received more consideration, and attention has been more particularly directed to making a proper tapering point which will adapt the spike to enter the wood and hold better without breaking the fiber—a point which is of greater importance than formerly by reason of the use of softer wood for ties as material becomes scarcer. The main object of this invention is to form a perfect point to the spike, thus insuring its best use and results.

RAILWAY RAIL JOINT.—Joseph P. Kelly, S. F. No. 428,757. Dated May 27, 1890. This invention relates to that class of railway rail joints in which the end of one rail is fitted directly into the end of the other rail. The invention consists in the novel construction of the adjacent ends or terminals of the rails. The object of the invention is to provide a simple and effective joint for rails which will avoid the use of the ordinary fish-plates, and which will make a practically continuous rail.

WINDOW VENTILATOR.—Peter Abrahamson, S. F. No. 428,739. Dated May 27, 1890. This patent relates both to the general class of ventilators and to that particular class which is exemplified by a patent issued to the same inventor Jan. 11, 1888, and in which two separate plates or sheets are so arranged in a frame as to leave a passage between them which communicates at the bottom with one side and at the top with the other side. The object of this invention is to provide an adjustable ventilator which a purchaser can obtain without special measurement of his window-casing, and which can be made to adjustably fit any window-casing, adapted to be readily inserted and as readily removed when not required. Another object is to provide for protecting the opening between the meeting rails of the sashes when separated.

COIN-ACTUATED ATTACHMENT FOR PHONOGRAPHS.—Louis Glass and Wm. S. Arnold, S. F., assignors to R. W. Smith, No. 428,750. Dated May 27, 1890. This invention relates generally to the class of devices designed

to be operated by a suitable coin deposited properly, and especially to an attachment of this class intended to be operated in connection with a phonograph. The object of the invention is to provide a suitable device by which the phonograph may be exhibited and heard by any one upon the deposit of a suitable coin.

COIN-ACTUATING ATTACHMENT FOR PHONOGRAPHS.—Louis Glass and Wm. S. Arnold, S. F., assignors to R. W. Smith, No. 428,751. Dated May 27, 1890. This device belongs to the same class as the preceding, and differs from it only in the construction and arrangement of parts, by which the deposited coin is enabled to act the phonograph in operation and open the communication between the spectacle of the phonograph and the hearing tubes.

The Mining Companies' Financial Standing.

The following is the financial standing on the first Monday of the present month of the mining companies listed on the two exchanges in this city:

	Cash.	Debt.
Alta.....	\$20,781	\$.....
Alpha.....	19,303	.....
Andes.....	21,924	.....
Bodie Con.....	113,605	.....
Benton Con.....	88,250	.....
Belcher.....	44,457	.....
Belle Isle.....	2,612	.....
Best & Belcher.....	4,067	.....
Bulwer.....	7,185	.....
Butte.....	17,531	.....
Challenge Con.....	14,351	.....
Caledonia.....	6,781	.....
Chollar.....	25,004	.....
Con. Cal. & Virginia.....	38,061	.....
Confidence.....	1,882	.....
Con. Imperial.....	705	.....
Con. New York.....	14,926	.....
Commonwealth.....	685	.....
Crocker.....	10,311	.....
Crown Point.....	3,294	.....
Del Monte.....	4,387	.....
East Sierra Nevada.....	15	.....
Eureka.....	8,770	.....
Exchequer.....	2,292	.....
Gould & Curry.....	20,625	.....
Grand Ridge.....	112,852	.....
Hale & Norcross.....	1,537	.....
Holmes.....	2,249	.....
Independence.....	6,830	.....
Julia.....	18,225	.....
Justice.....	146	.....
Kentuck.....	15,057	.....
Lady Washington.....	687	.....
Locomotive.....	6,321	.....
North Belle Isle.....	0,671	.....
North Commonwealth.....	257	.....
Mexican.....	10,370	.....
Monaco.....	13,692	.....
Nevada.....	15,696	.....
Nevada Queen.....	11,54	.....
Occidental.....	32,316	.....
Ophir.....	32,032	.....
Overman.....	21,362	.....
Peer.....	4,470	.....
Peerless.....	22,418	.....
Potosi.....	14,352	.....
Savage.....	5,042	.....
Scorpion.....	12,915	.....
Seg. Belcher & Mides.....	2,804	.....
Silver Hill.....	2,216	.....
Sierra Nevada.....	2,147	.....
Silver King.....	7,717	.....
Standard.....	359	.....
St. Louis.....	4,634	.....
Syndicate.....	10,034	.....
Union Con.....	12,441	.....
Utah.....	774	.....
Welton.....	.....	.....

*Collecting assessment.

†Mine expenses not included.

‡Mine expenses and full bullion return not included.

§Bullion at Mint, \$11,080—mine expenses not taken out.

||Collecting assessment—month's mine expenses and bullion out, not included.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

AMADOR CANAL AND IMPROVEMENT CO., June 2. Capital stock, \$100,000. Directors—W. A. Keeper, F. P. Bull, John C. Quinn, W. H. Davis and C. E. Parks.

OAKDALE LAND AND IMPROVEMENT CO., June 2. Capital stock, \$500,000. Directors—Mendel Esberg, A. Roos, M. J. Newmark, E. Ettinger, J. Ettinger, N. S. Harrold, Louis Kahn, D. S. Rosenbaum and Geo. S. Sperry.

ETHEL TICKET-REGISTERING PUNCH CO., June 2. Capital stock, \$100,000. Directors—E. E. Etzel, T. M. Sweet, J. W. Dermody, W. D. Etzel and H. R. Judah.

WOMEN'S EDUCATIONAL AND INDUSTRIAL CO., June 2. Object, the increase of good-fellowship among women, in order to promote the best means of securing their educational, industrial and social advancement. Directors—Margaret Deane, Hannah M. Solomons, Mary B. West, Jean Parker, Emilie E. Kirketerp, Harriet M. Skidmore, Abbey Cheney, Adeline N. Belcher, Ellen A. Milkken, Katherine Peixotto and May Lightbody.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none out worthy men.

J. C. HOAG—San Francisco.
R. G. BAILLY—San Francisco.
SAMUEL CLIFF—San Luis Obispo Co.
O. J. WADSWORTH—Cuba, Cal.
W. W. THORALD—Los Angeles and Orange Co's.
E. H. TAFT—San Joaquin Co.
JOHN B. HILL—San Diego Co.
E. H. SCHAEFFLE—Caveros Co.
FRANK S. CHAPIN—Colusa Co.
JOHN R. BOYCE—Alameda Co.
W. B. FROST—Marcel and Stanislaus Co's.
GEO. WILSON—Sacramento Co.
T. M. STARKES—Sierra Co.
H. KELLEY—Modoc Co.
H. H. PARKER—Del Norte Co.
WM. H. HILLARY—Oregon.
R. G. PARSONS—Oregon.
R. G. HUTTON—Montana.

MECHANICAL PROGRESS.

A NEW MODE OF CONSTRUCTING BOILERS.—Boilers are about to be made in England to consist of a series of weldless rings joined together by rivets. London *Engineer* says that Sir Joseph Whitworth & Co. have in contemplation the erection of additional works in the neighborhood of the Manchester Ship Canal, where they propose introducing an important departure from the present practice in the erection of marine and other boilers. It will be remembered that at the recent Manchester Exhibition the above firm exhibited a weldless boiler ring, 12 feet diameter by 6 feet long, which at the time attracted very considerable attention; and at their new works it is their intention to lay down a plant for the construction of boilers built up of weldless rings, for which it is claimed that while they reduce the weight of the boiler by 30 per cent, it is at the same time kept up to its full strength. So far, no marine boilers have been constructed on this principle, but that there is no difficulty in the manufacture of these weldless boiler shells for the above purpose has been evidenced by what Sir Joseph Whitworth & Co. have already accomplished. In some instances these shells would go up to 14 feet diameter, and the practically insurmountable difficulty of conveying such large pieces of work either by rail or road renders it, of course, necessary that works for their manufacture should be placed at the water side.

AUTOMATIC PRINTING PRESS FEEDER.—A firm in London has devised and put in operation an ingenious arrangement by which the operation of automatically feeding single sheets of paper to printing machines of the ordinary cylinder pattern or two feeder, perfecting, lithographic, or ruling machine, is successfully carried out. The apparatus is the invention of Messrs. Cleather & Nichols, of 23 Manchester avenue, Aldersgate street, London. By this apparatus the operation of automatically separating a single sheet of paper from the bulk and laying the sheet to exact register in the grippers of the machine is perfectly effected. To carry this out, two boards are affixed in the usual position on the sides of the machine, which sides also carry two vertical sliding frames surmounted by a cross-head which supports a radial beam for the purpose of regulating the weight or pressure upon the paper, the apparatus being allowed efficient play on the slides by means of anti-friction pulleys. The motive-power for carrying the sheet forward is taken by means of a chain-drive from the shaft of the cylinder, thus insuring that no sheet is fed except in accord with the motion of the cylinder.

GAS AND STEAM IN THE SAME CYLINDER.—In a paper recently read before the French Academy of Sciences, M. Ch. Tellier spoke of a new scheme for cheap power, by which he claims to be able to produce motive-power by using a combustible gas, employing the heat generated by its explosion to generate steam, and the use of the vapor of ammonia. When the gas has operated on the piston, it escapes at a temperature of about 400 degrees into a generator, where steam is produced, which is used to act upon the opposite side of the piston from the gases. There are two advantages claimed for this—the high temperature due to combustion of the gas prevents cylinder condensation, and the steam assists in lubrication. The completed machine for which this claim is made will consist of two cylinders, one making its forward stroke under the action of the explosive gases, and its return stroke by the action of steam; the other is operated entirely by vapor of ammonia. Under these conditions, says M. Tellier, there can be no doubt, theoretically or practically, that .44 pounds of coal per horsepower per hour is an economy which can be secured.

CASTING AND FORGING.—The great distinction which has heretofore existed between casting and forging is being gradually lessened. Press forging—forming articles by pressing them into shape in a red-hot or half-melted condition—is now being very generally introduced all over the world. The most intricate forms and sharpest lines are now readily produced by recently invented machinery capable of exerting thousands of tons of pressure. A large number of the smaller articles are now being made on this principle in San Francisco. Powerful plungers, driven by hydraulic or other force, forcing or "flowing" the heated iron into metallic molds, simply require celerity of action to prevent cooling by radiation. The system is both practical and economical as compared with the old methods of casting or hammering.

WHY THE SOUTH DOES NOT MAKE STEEL.—According to a communication from William B. Phillips of Birmingham, Ala., in the Bulletin of the American Iron and Steel Association, the chief reason why the South does not make steel is a matter of dollars and cents. Furnaces down there are doing so well on foundry forge and mill irons that the inducement to enter into the production of the metal in its higher forms is as yet a sentimental appeal to local pride and the spirit of emulation. So long as steel-making, which is an untried experiment in the South, with an outcome to be determined by a contact with contingencies, can offer no higher rate of profit than ordinary

pig iron, it is not to be expected that capital will quit the beaten track of manufacture, now satisfactory in its pecuniary results, in order to demonstrate a capacity for a wider range of accomplishment.

PERFORATED SAW BLADES.—Perforated blades for band and circular saws are just now attracting attention in Germany, and are apparently giving general satisfaction. Blades of this character, as some of our readers may know, are not entire novelties, but have been known in modified forms for some years. As a general thing, however, their use has been much decried. Still they appear to have some advantages worth considering, and many claims of superiority are made for them. Among them is that of reduced blade friction, due to reduced area of rubbing surface; less tendency to heat, because of the circulation of air through the holes, and economy of power. The holes further prevent the dangerous extension of cracks in the saw blades, and, in general, make it a comparatively easy matter to keep the saws in good running order.—*R. R. Gazette.*

A NEW RAIL.—The Bargioli rail, which the Southern Pacific Company will experiment with, is the invention of an Oakland mechanic. It is in two sections. The upper part or rail proper has a wedge flange which sets in a matrix groove in the lower part or bed. Both are united firmly by bolt catches. In a channel at the foot of the wedge terminal will be inserted a cable or bundle of telegraph wires. A perfect insulation is thereby effected, and the pole system of stringing wires will be obviated. Telegraphic communication between stations and gliding trains can be maintained easily. It is claimed that this new-fangled rail will afford better traction and that it is superior generally.

ALUMINUM ALLOYS.—According to Mr. J. H. G. Dagher, says the *Horological Journal*, alloys containing 60 to 70 per cent of aluminum are very brittle, glass hard and beautifully crystalline. With 50 per cent the alloy is quite soft, but under 30 per cent the hardness returns. The 20-per-cent bronzes have a whitish-yellow tint, and is so brittle that it can be pulverized in a mortar. The brittleness of alloys containing more than 11 per cent prevent their use, but from 11 per cent downward to 1½ they are of very great value, possessing great tensile strength, high resistance to compression, low specific gravity, and greater resistance to corrosion than any alloy known.

ANNEALING AND HARDENING.—Copper, brass, German silver and similar metals are hardened by hammering, rolling or wire drawing, and are softened by being heated red-hot and plunged in cold water. Copper, by being alloyed with tin, may be made so hard that cutting instruments may be made from it. This is the old process of hardening copper, which is so often claimed to be one of the lost arts, and which would be very useful if we did not have in steel a material which is far less costly and far better fitted for the making of edge tools.

PROPELLING CARRIAGES BY GAS. is a new method now being introduced into the cities of Germany. The gas is generated from benzene. Numerous vehicles of this description are said to be in successful operation in several cities and on some of the country roads, where they move at the rate of ten miles an hour. A new motor has been devised for this purpose, which is placed in the rear of the vehicle and over the main axle. The benzene is carried in a receptacle under the seat, which holds enough of the fluid for a trip of 80 miles. The gas mixture is ignited by an electric spark.

ALUMINUM BRONZE FOR PROPELLERS.—Aluminum bronze is coming into more general use in Germany, and as an instance it may be mentioned that aluminum bronzes are being used for propellers for all the naphtha boats that are being built at the establishment of Esher, Wyss & Co. It is also being used for propellers elsewhere, for bearings, boat-fittings, etc. It consists of 90 per cent copper, 10 per cent aluminum, looks almost like gold, and has the same weight as iron.

IMPORTATION OF IRON INTO JAPAN is increasing yearly. Last year the total was nearly double that of 1887. The increase was most marked in rails, but iron work and machinery show a marked increase. The value of the iron produced in Japan is only about \$250,000 per annum, or about three per cent of the value imported.

THE SCREW.—Screws of all kinds are still a theme for study, especially in the wood working line. Some one has proposed to make them hollow, and after they have been driven into place, to expand them a trifle with a wire nail to get more of a hold in the wood.

ENGINE VIBRATION.—In cases where there has been excessive vibration noticed with engines hotted to beams or girders of the upper stories of buildings, hanging heavy weights from the bottom of the engine has overcome the vibration almost entirely.

IN USING EMERY WHEELS it has been found that at a high speed one ounce of wheel material would only grind off six ounces of metal, while at a lower speed it would grind off 11 ounces. At this lower speed the wheel was making 2150 revolutions.

SCIENTIFIC PROGRESS.

Formation of Hailstones.

Meteorologists are not a unit in agreement upon the manner of formation of hailstones. The theory of Dove has been given most credence. He believed that the hailstones passed rapidly from the cold air to the warm, moist air, and again from the warm air into the colder, thus alternately taking on a jacket of moisture and freezing it around the nucleus or heart. The formation of the nucleus itself, it is conceded, is from the snowflake in the cold cloud, which being whirled about forms a small ball, about which subsequent layers congeal as the ball is tossed about into the atmosphere of different temperatures. The hailstone, from its varying shapes and angularities, shows that it has had a wild and irregular career in the sky, sometimes melting into crooked shapes, then being tossed upward and congealed rapidly. It takes but ten minutes, so the meteorologists say, to form the largest hailstones known. Some are nearly spherical, more rough and jagged, while some have a flat face on one side and are covered with nodules on the other.

The most remarkable hailstorm on record was that of July 13, 1783, which passed from Touraine, France, to Belgium. It traveled in bands or separated belts. While the western band had a width of ten miles and a length of 420 miles, the eastern band had a width of five miles and a length of 500 miles. A band of rain twelve miles wide was between them. Over 1000 communes suffered and property to the value of \$5 000 000 was destroyed. The most fatal storm of this kind was that of April 30, 1888, at Moradabad, India, in which over 280 lives were lost. John Eliot, meteorological reporter to the Government of India, says of this storm: "Verandas were blown away, and the massive Pucca portico was blown down. It was nearly dark. Hail was on the ground two feet deep. Persons caught in the open were simply pounded to death. The area of this storm was only about six or seven miles around Moradabad."

Probably the worst hailstorm that ever occurred in this country was that of June 16, 1882, at Dubuque, Iowa. For 13 minutes, beginning at 2:35 P. M., hailstones fell, some of which were 17 inches in circumference. The largest weighed 1½ pounds. They exhibited diverse formations, some of them having knobs and icicles half an inch in length. Others were surrounded by rings of different-colored ice with gravel and blades of grass imbedded within. The foreman of the Novelty Iron Works stated that he melted two which had living frogs within them. This report comes from the *Monthly Weather Review*, issued by the Government.

A Dubuque newspaper report accompanying the picture states that hailstones as large as cocoanuts were thrown down, and some ladies cooled a pitcher of lemonade with them, and wrote to Eastern friends that they had made the drink palatable with ice frozen in that city on June 16. In falling the stones went through the roofs of street cars.—*Baltimore Sun.*

AQUEOUS SOLUTIONS OF ESSENTIAL OILS.—It has been found by Bergmann that while mixtures of the fixed alkali soaps with hydrocarbons and essential oils form only emulsions in water, under separation of the respective oils, a mixture of an ammonia soap with an essential oil will form a clear solution in water, especially in presence of an excess of ammonia. Turpentine oil, or some other essential oil, is first mixed with castor oil, or a mixture of it with some other fat oil, the mixture is then subjected to the action of concentrated acid, and the product, after being washed with solution of salt, is saturated with ammonia in excess; or the fat acids may be first separated by treatment of the fatty oil with concentrated acid, then washed with salt solution, and the essential oil added either before or after saturation with ammonia. The preparation thus obtained is said to form a clear solution, and not only to possess the properties of a soap, but also to exercise, in aqueous solution, the solvent action of an essential oil.—*Pharm. Jour.*

A NEW FUEL.—A St. Petersburg journal states that a Russian civil engineer, M. de Nicolaoff, has succeeded in producing a fuel from peat greatly resembling anthracite coal. The inventor has obtained a patent for his process, which is said to be accomplished by the aid of certain chemicals, and lately an imperial commission has been engaged in experimenting with the fuel, the result having been very favorable. The peat was found to give a little less heat than ordinary coal, but more than fir or birch wood, which is largely used on railways and steamers and in factories in Russia. In other respects, however, the peat is superior to coal, being cheaper, containing but a very small percentage of sulphur, and being much smaller in bulk. The artificial fuel throws off no dirt and emits no smell, while burning with a clear white flame. It is believed that the new fuel has a great future before it, the Russian Government being much interested in the invention.

GRAVITATION AND DISTANCE.—Some one says that the physicist is bewildered by the apparently simultaneous action of gravitation upon

widely separated bodies. M. J. Van Hepperger thinks that the time taken by gravitation to travel the distance from the sun to the earth does not exceed one second. Would it not be more reasonable and correct to say that gravitation is a constant force, always universally present; that it never "travels" as do light and electricity, and whenever the greater loses its influence by distance, the lesser acts immediately—that neither "travels"? Distance simply weakens the force.

Brittle Bodies.

Under the head, "What are brittle bodies?" Prof. Frederick Kick recently communicated the preliminary results of some very interesting experiments in *Polytech. Journal*, 274, 405. He starts with two theses: (1) Those bodies or substances are brittle which, in order to become ductile or plastic, must be subjected to a high pressure, acting uniformly from all directions; (2) the hardness of a substance may be determined with numerical accuracy by means of its shearing stress if every bending and every fluxion of the material particles be excluded. To substantiate the first thesis, the following experiments were made with pieces of gypsum, eucastite, rock salt and calcite, all of which are, under ordinary conditions, very brittle. The test materials were cut and ground into prismatic shape. A suitable piece of ordinary iron gas pipe was closed at one end with a well-fitting plug, and filled with molten shellac, avoiding carefully any formation of bubbles. Into this were immersed the test pieces, which had previously been coated with shellac solution, and after filling up the remaining space with shellac, the top was closed by a second plug. The pipe was allowed to cool slowly for several hours, and then bent into U-shape. In dilute nitric acid the iron pipe was dissolved, leaving the shellac core unaffected. This was dissolved in alcohol, leaving the bent prism of rock salt, eucastite, etc., in perfectly coherent shape. The softer enveloping material, the better the results.

The author constructed then a simple but effective apparatus, in which oil was the enveloping medium instead of shellac, and succeeded in altering the shape of the most brittle substances without affecting transparency or coherence. In regard to the second thesis, the author's experiments are yet few in number. It seems true that the hardness and shearing stress are directly proportional, but more experiments are necessary to establish the thesis as a law of nature. Shellac and tin are substances of widely differing nature and composition. Their hardness, however, is equal, and Prof. Kick finds for both the same shearing stress, i. e., 2.6 kilogrammes to the square centimeter.

DUST IN THE AIR.—Mr. John Aitken has been continuing his researches into the number of dust particles in the air, and recently read a long paper on the subject before the Royal Society of Edinburgh. Swiss air he finds to be comparatively free from dust. So is Highland air; for example, some wild parts of Argyleshire, Scotland, have little more than 200 particles in the cubic centimeter of air. This is about the lowest he has yet observed. Paris has 210,000 to 160,000 particles per cubic centimeter. In all the fogs tested, the proportion of dust was found to be very high. Particles of dust serve as so many nuclei on which the moisture of the atmosphere can most readily condense into fog.

INFLUENCE OF HIGH TEMPERATURES ON CONDUCTIVITY.—The alterations in the conductivity of pure copper, aluminium and magnesium, and of commercial zinc and German silver, after a lengthened exposure to a high temperature, have recently been investigated by J. Bergmann. Discs, 70 millimeters in diameter, were heated to 300 degrees C., and maintained at that temperature for one hour, and then allowed slowly to cool. The conductivity of copper was increased by something like 2.4 per cent by this process; that of aluminium, magnesium and zinc being increased respectively, 5, 6.8 and 2.4 per cent. The conductivity of the alloy was, on the other hand, diminished by about 2 per cent.

A UNIQUE BAROMETER.—An old Belfast sea captain has improvised a unique barometer which he believes to be most accurate. It consists of a thin strip of white pine with a number of cross-pieces upon it. This is hung on the side of a building, and when damp weather is approaching the barometer bulges out in the center, while in dry weather the center sinks in and the ends out. The captain claims it to be correct, and would not exchange it for the most valuable patent weather indicator.

A STRANGE GIFT, IF REAL.—M. Pedroux, a physician at Nantes, France, has the strange gift of being able to see the color of sounds. He says that human voices are red, blue, black, tan, slate and all other colors, and that the color of some very handsome women's voices is like buttermilk.

IN THE MILK OF A CODEFISH, the microscope discovers animalcules so minute that 100,000 of them would not exceed in bulk a single mustard seed; and the creatures are supplied with organs as complete as those of the whale or elephant.

PIG IRON is made in 25 States of the Union.

GOOD HEALTH.

TURPENTINE FOR LUNG TREATMENT.—A writer in the *Medical and Surgical Journal* says: "I have been using pure oil of turpentine in affections of the throat and lungs for some time, and find better and more satisfactory results than from any other remedy I ever tried. I use the ordinary hand atomizer, and throw a spray of the liquid into the throat every few minutes, or at longer intervals, according to the gravity of the case. The hnh of the instrument should be compressed as the act of inspiration commences, so as to insure application of the remedy to the whole surface, which can be done in cases of children very successfully. It is surprising how a diphtheritic membrane will melt away under an almost constant spray of pure oil of turpentine. I now use the turpentine spray whenever a child complains of sore throat of any kind. In cases of tuberculosis of the lungs, bronchitis, and the latter stages of pneumonia, I have found the turpentine inhalation very beneficial. I use an atomizer, or paper funnel, from which the turpentine may be inhaled at will. I hang around the bed and in the room, flannel cloths saturated with oil of turpentine, in all cases of catarrhal bronchitis—in fact, in all affections of the air-passages, and my patients invariably express themselves as being much relieved."

MEDICATED LIQUID SOAPS.—In a paper read before the recent congress of Russian Pharmaceutical Societies, Herr Seidemann called attention to the therapeutic value of liquid soaps, which he claimed to present the advantages of being more suitable for injection, favoring admixture of medicinal substances, and being always producible from vegetable oils, thus avoiding the use of animal fats. The formula recommended by him for a liquid soap is to mix one part of caustic potash dissolved in an equal weight of water with four parts of olive oil and one-fourth part of alcohol, and shake it vigorously during ten minutes. The mixture is repeatedly stirred during the next hour, then mixed with an equal quantity of water, and after standing several days filtered. The author states that carbolic acid incorporated with a potash soap has its caustic and poisonous properties paralyzed, while its disinfectant action appears to be increased. It is also stated that the Berlin District Sanitary Commission has found a solution of potash soap in 10,000 of water to completely prevent the development of the spleen fever bacillus, and has recommended a solution of 15 parts in 10,000 as one of the best disinfectants.

ACHIEVEMENTS OF SURGERY.—At the Surgical Congress at Berlin, Prof. Gluck of Berlin gave (says Dalziel) an exhibition showing a most valuable advance in surgery, namely, the successful substitution of catgut, ivory, and bone freed from chalk, for defects in bones, muscles, and nerve sheaths. The juices of the body are sucked up in the inserted material, thereby establishing the junction of the separated ends, without any shortening of the part. He presented the cases of patients in whom there had been an insertion of from six to ten centimeters of catgut to supply defects in the leaders of the hands, to which complete mobility had been restored. This case has previously been impossible. In the case of another patient Prof. Gluck removed a tumor from the thigh, causing a considerable defect in the bone. He inserted ivory, and no shortening ensued. In another case he removed a large piece of nerve in the groin and inserted catgut, and the functions remained completely satisfactory.

TIGHT COLLARS.—The influence of wearing tight collars in impeding the circulation in the head by pressing on the jugular veins is well known to military surgeons with the troops in India; but the bad effects of such pressure in cooler climates have been demonstrated by the observations of Prof. Forster of Breslau, who states that 300 cases have come under his notice in which the eyesight has been affected by the disturbance of the circulation caused by wearing collars that were too small.

CONSUMPTION FROM DISEASED MEATS.—The result of several hundred experiments conducted at the laboratory of the University of Pennsylvania leaves no room for doubt that consumption can be, and beyond question very often is, contracted by eating tuberculous meats. It was found that calves and pigs fed on milk infected with tuberculous material from a human source contracted consumption, and the converse would seem probable.

TOBACCO SMOKE quickly contaminates delicate fruit of all kinds. A few whiffs blown upon a box of raspberries will entirely destroy the delicate flavor of the fruit and render it unpalatable. The same in a degree may be said of strawberries.

CURIOUS SPRING.—There is said to be a spring of a curious nature near Stonington, Conn. When the water is drunk the veins of the drinker are said to swell in a most extraordinary manner; but the effects gradually disappear.

POISON IN CELERY.—Dr. Charles M. Creeseon of Philadelphia states that he has more than once found the typhoid bacilli in the juice that has been squeezed out of celery grown near Philadelphia. *Annals of Hygiene.*

ENGINEERING NOTES.

RAILWAYS IN AFRICA.—The French are very active in Central Africa, but in a quiet way. A French engineer, Capt. Trivier, has just completed a journey through Africa, similar to that performed by Stanley, but undertaken with a view to strengthening French commercial stations. He has strengthened old and established new French stations all the way from the West Coast to the south of the Congo river. It is expected that active steps will be taken to facilitate the development of those regions by the construction of railways which shall form a means of communication through French territory from the coast to the river Congo. A company is being formed with that in view. The Congo State Railway Company also intend to open up that region as rapidly as possible by proper railway connections. Considerable attention is bestowed at the present moment upon the colony of Tunis, which has a fascinating reputation in France for its mineral wealth and resources. Railways are being extended in all directions, and as the present constructive capacity is not sufficient for the wants of speculators, a bank has just been formed for financing such enterprises in Tunisia. This rapid opening up of Central Africa to the commerce of the world will soon prove one of the marvels of this progressive age.

THE HUDSON RIVER TUNNEL has been found to be a much more difficult engineering project than was originally supposed. As the work proceeds out under the river, the silt becomes softer and more difficult to hold. Engineers are coming to the conclusion that it will be impossible to go much farther with the work by use of the present shield. The one now in use was of the same construction as was used in the stiff clay under the Thames river at London, but has never before been used in soft, wet ground. The lining on the New Jersey side is already in bad condition, hulging in places, and will probably have to be stiffened with more lining to make it safe. Very little progress is now being made from either side. The difficulties and discouragements are great enough to discourage the most skillful engineers. It is thought that some new methods will have to be employed or the work must shortly stop again. It is to be hoped that the work may in some way be completed, as its abandonment would be a great loss to capital and a decided damage to modern engineering. Railroads must eventually cross the river either over or under it, or both. Ferry boat transportation will have to be abandoned at all such places.

SHORTENING THE ROUTE TO EUROPE.—The scheme of greatly shortening the time between America and Europe by the construction of a railway to the coast of Labrador, and putting on a line of fast steamers to Milford Haven, looks less reasonable the more it is considered. No engineering plans have yet been formulated. The distance, even, is as yet quite uncertain, but not less than 1000 miles of road will be required. The cost of the work cannot be intelligently guessed at. The country is desolation. The winters' snows are fearful. Even grain will not ripen in the short summer. The traffic along the greater portion of the route would be nearly nil. More than 30 rivers will have to be bridged. The proposed terminus is at a port on the Labrador coast, which there is good reason to believe is closed by ice a large portion of the year. But few travelers would think of taking such a route outside of, say, four summer months. It is quite safe to say that the proposed Labrador railway will never be built.

THE HIGHEST GRADE.—An interesting little railway has just been opened for traffic between Lynton and Lynmouth, which are separated from each other by a cliff nearly 500 feet high and are only connected by a road so steep as to be almost impracticable for vehicles. The new line is 900 feet long with a uniform gradient of 1 in 13, which is the steepest incline in the world. The road is operated by two cars connected and moved by a wire rope, the one dragging the other up the line as it descends, the necessary excess of weight being obtained by filling a tank on the car at bank from the reservoir already mentioned. Safety appliances have been fitted to prevent a breakaway of the cars in case of accident.

BRIDGING THE NORTH RIVER.—The Hudson river bridge known as the Greene hill has become a law by lapse of time without the signature of Gov. Hill. It provides for erecting what is practically Mr. Lindenthal's bridge at New York, a central span of 2550 feet, and six tracks, with room for ten, being provided. It is not in the interest of the Lindenthal bridge which is now before Congress, but so far as appears upon the surface is a mere "strika," to get a certain control of a valuable franchise and sell out. Should the Lindenthal bill pass Congress, however, it will require no State action to confirm it, while the New York bill is worthless without concurrent action by both New Jersey and Congress.

PUMPING UNDER GREAT PRESSURES.—In the coal mines at Kladow, in Bohemia, there are located two pairs of compound pumping engines which form a notable plant. They drive double-acting plunger pumps with 28-inch stroke for one engine and 3-foot stroke for the

other, and run at a speed of from 40 to 72 revolutions per minute. The engines are located 1700 feet below the surface of the ground, and they raise water against this whole head, doing the work with ease and smooth running. The pumps are the invention of Prof. Riedler of the Polytechnic Institute at Berlin, and the design has given remarkable results wherever used.

USEFUL INFORMATION.

A NEW JOINT MAKING MATERIAL.—A permanent and durable joint can, it is said, be made between rough cast-iron surfaces by the use of mineral asbestos mixed with sufficient white lead to make a very stiff putty. This will resist any amount of heat, and is unaffected by steam or water. It has been employed for mending or closing cracks in cast-iron retorts used in the distillation of oil and gas from canal coal. The heat being applied to the bottom of the retorts and the temperature of the iron maintained at a bright red heat, after a time the bottom of the retort would give way, the larger portion of the crack being downward toward the fire. The method employed was to prepare the mixture, and place it on top of a brick, then put the brick on a bar of iron or shovel, and press the cement upward to fill the crack in the iron, holding it for some time until it had penetrated the cavity and somewhat set. Of course, during this operation, the lid was removed from the retort, so that no pressure of gas or oil forced the cement outward until set. For several reasons the use of asbestos is very excellent. It is well known that this substance cannot burn and there is no danger of it being the cause of fire in the shops where it is used. The idea is being largely adopted by foundrymen generally.

TO CLEAN A SPONGE.—When a sponge has become slippery and disagreeable to the touch, the following simple method will be found very efficacious in cleansing it: Put a piece of common soda, about the size of an egg, into a quart of boiling water; allow it to stand until just brisk warm, by which time the soda will be entirely dissolved, then put in the sponge; let it remain for half an hour, then squeeze it thoroughly, extracting as much of the slimy substance as possible. Repeat the process, using clean water prepared as above, until the sponge feels soft and pleasant to the touch. Two waters are generally sufficient to effect the purpose.

WEST POINTERS NEVER SMILE.—It is said that smiling is something totally against the rules at West Point. No man ever dreams of smiling at anything, no matter how ludicrous, when he has been in the West Point academy a few weeks. The face is required to have a stony, expressionless stare, the eyes fixed as if in a trance, gazing on futurity. The head is thrown back, the arms held rigidly, the body straight, and this is the attitude of "attention," which is expected to be the normal condition of a cadet, except when speaking with his own or with lower classmates.

COSTLY BARN.—A contemporary says that the costliest horse barn in the world belongs to D. E. Crouse and is located at Syracuse, N. Y. It has now cost the owner something like \$700,000. Incidental expenses will make the stable cost little short of a round million. Rockefeller, the Standard oil king, is about completing a \$3,000,000 mansion at Tarrytown. The estate comprises 1000 acres, and a \$100,000 house was torn down to furnish a foundation for the new stable.

ALLOYS.—Among the most valuable substances known in the arts are the metallic alloys. It has been recently discovered that strong as steel is, it can be made yet stronger by an alloy of three to five per cent of nickel. This means that in the future we can have larger bridges, higher towers and lighter machinery than ever.

TO PRESERVE LAMP CHIMNEYS.—A woman in Americus, Ga., is using a lamp chimney that she has used daily for the past eight years, and she expects to use it for many years yet. She says that she hauled it in salt and water when it was bought, in 1882, and no matter how large a flame runs through it, it won't break.

GOLD LEAF.—The Berlin gold-beaters at the Paris Exposition showed gold leaves so thin that it would require 282,000 to produce the thickness of a single inch, yet each leaf was so perfect and free from holes as to be impervious to the strongest electric light.

CEDAR OIL is now produced at Lyndon, Vt., by distillation. The small branches of cedar trees are used, and are much more convenient and productive than shavings, which are used to some extent. The oil can be profitably produced wherever the cedar grows.

QUICK PHOTOGRAPHY.—A great progress is being made in rapid photography. Lord Rayleigh has photographed a minute jet of water in the 100,000th of a second; and a new camera takes ten successive views a second on the turning of a crank.

A SILK HANDKERCHIEF, so often recommended for wiping spectacles or eyeglasses, is not good for this purpose, as it makes the glasses electrical and causes the dust to adhere to them.

ELECTRICITY.

THE BOLDEST ELECTRICAL PROJECT yet suggested is one which is under consideration in Russia for a line from St. Petersburg northeast to Archangel on the White Sea, a distance of over 500 miles. It is proposed to furnish the electric current from a series of generating stations distributed along the line, and the cost of the undertaking, including rolling-stock, is estimated at only about \$15,000 per mile. Archangel, the proposed northern terminus, lies in the icy latitude of 64½ degrees, almost up to the Arctic circle. It is far above the latitude of the northern shore of Hudson's bay, and almost as far north as the narrowest part of Behring straits, the suggestion of crossing which by a railway has been assumed by many to be impracticable. Who knows but that electricity is to furnish the solution of the difficulty of operating railways in extremely cold regions which attends the use of steam? Evidently an electric railway can be built of any desired length if power-generating stations are supplied at proper intervals, and hence it becomes only a question of obtaining sufficient traffic to warrant the cost of construction and operation. The electric locomotive has no steam or water pipes to freeze and burst in the intense and long-continued cold of a far Northern winter, and electricity, by which trains can already be lighted, will doubtless be long and successfully applied to the purpose of heating also. Should the remarkable enterprise of an electric railway to the White Sea be actually carried into execution, it will not be hard to believe that a similar line may be pushed through Alaska to meet at Behring straits an extension of the Russian railway system through Siberia, and complete a continuous railway line uniting America, Asia and Europe.

ELECTRICITY VS. HORSES.—Joseph Wetzler, a well-known New York electrical expert, expresses his opinion on the comparative economy of horses and electricity on street railways as follows: "The operation of street railways by electricity, although even now completely demonstrated to be more economical than by either horses or cables, is yet too recent to afford the more reliable figures which can only be obtained after extended use; but from an investigation recently made on a number of roads by O. T. Crosby, some very interesting data are developed." The results of Mr. Crosby's investigation show that the average cost of motive-power for the roads in Washington, Richmond, Cleveland and Scranton, was about 5.09 cents per car mile. At the late eighth annual meeting of the American Street Railway Association, the committee to whom the matter was referred, reported that "if it is desired to make a change from horse-power, electricity will fill the bill to perfection, no matter how long or short the road, or how many passengers are carried. In the investigation of the subject the most satisfactory results have been shown; it not only increases the traffic over the road, but reduces expense, and actually enables us to operate a line, which heretofore entailed a loss at a profit."

AN ELECTRIC SEA GOING VESSEL.—While it is beyond a doubt that Americans lead in many of the classes of electrical development, there is also no doubt that in the application to marine engines the English lead us. A second sea going electrical vessel has now been launched. It is 26 feet long by 5 feet 4 inches beam, and will hold 15 people. The craft has 18 inches mean draught and a displacement of 2½ tons. She steers by tiller, and a switch controlling the power is within easy reach of the helmsman. Under the seats are 40 hand-lined compartments for accumulators. With the battery, it is figured that power will be furnished at one charge sufficient to propel the craft 8 miles an hour for 5 hours. The motor is in the central compartment of the boat. This craft is built for sea-going purposes, and has trial trips indicated considerable speed and sea going qualities. She was built for Mr. Paare, her owner, by W. S. Sargent, electrical-launch builder, Cheswick, England.

COMPUTATIONS BY ELECTRICITY.—The computations to be made after the taking of the census the present year are to be made by electrical machinery, which is capable, it is said, of doing the ordinary work of 55 hours in five hours. Special sections of the canoes, including homes and farm mortgages, etc., will receive careful attention, and every effort will be made to have the entire work performed in the shortest possible time consistent with the immense amount of necessary labor and the importance of the general result.

RIVETING BY ELECTRICITY has been successfully accomplished. The cold rivet is placed in the hole, and when heated to the proper temperature it can be closed by any of the ordinary apparatus now in use. The heating of a half inch rivet of two or three inches in length takes about half a minute.

ELECTRICITY IN LONDON FOGS.—In London they are utilizing electricity in a novel way. During heavy fogs, horses carry an electric light on their heads which can be illuminated as occasion requires, the storage battery being in the wagon.

BASE BULLION is being shipped by the carload from Colville, Washington, to Newark, New Jersey, for refining.



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SAN FRANCISCO:
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Business Announcements.

[NEW THIS ISSUE]

Mining Capital Wanted—Real Estate Exchange, Salt Lake City, Utah.
Flax Packing—W. T. Y. Schenck.
Rock Crusher—Pelton Water Wheel Co.
Iowa's Resources—Board of Trade, Boies City.

See Advertising Columns.

Passing Events.

As the fact becomes recognized that there will be no silver legislation by Congress at this session, the price of the metal gradually runs down. There has been an unloading of bullion which has aided in depressing prices, and it is thought there will be a still further decline. However, toward the end of the week there was a recovery in value as compared with the previous days.

Arrangements have been completed for a State Convention on the World's Fair in San Francisco on Sept. 11th, and a Committee of Arrangements has been appointed. It is pleasant to note that some systematic action is to be taken toward having California properly represented at the coming fair.

Two San Francisco foundries have sent representatives to Washington to bid on the new Government cruisers, and it is greatly to be hoped that some more of the vessels will be built on this coast.

There is very little to note concerning the mining situation aside from what we have mentioned in our usual "Mining Summary."

Local Shipbuilding.

The new cruiser *SAN FRANCISCO*, being built at the shipyards of the Union Iron Works, is rapidly approaching completion and will be ready for her trial trip early in July.

W. H. Taylor, the president of the Risdon Iron Works, and L. R. Meade, secretary of the same establishment, left the city on Monday for Washington to submit bids for the 5100 and 3300-ton cruisers, bids for which are to be opened on the 10th inst.

It is evident that the building of large iron and steel vessels is destined to be a very prominent industry in San Francisco. When the Union Iron Works commenced to prepare to do such work, our own people were somewhat skeptical as to the success of the undertaking, and the authorities at Washington could hardly believe that California mechanics had the facilities or skill to do the work. Experience has, however, shown it can be done, and done well. The Charleston was a complete success, and the San Francisco is about ready for trial.

Now more cruisers are to be built, and another large firm in San Francisco has started in to get the work. A few years ago there was no one prepared for such construction; but one firm having been successful, we now see two anxious to bid. This argues well for an increase in this industry in San Francisco.

This city has the necessary geographical situation to become the seat of a very large industry in the shipbuilding line. We have contented ourselves mainly thus far in building schooners and steamers for coasting and inland trade, but there is no reason why this branch should not be widely extended. Having proven that Government cruisers can be built here in competition with Eastern shipbuilders, it is evident that any kind of vessel can be constructed. The existence of the Pacific Rolling-Mills, with its extensive plant, is an important factor in this connection, for it is in a position to aid any of the local foundries which may obtain Government contracts. Certain work done by those mills relieves the foundries of the necessity of adding expensive appliances to their own plants. We should very much like to see two or three of our large foundries, each working on a Government vessel or two, and it is very probable this will be the case in due course of time.

The World's Fair.

At a meeting held in San Francisco on Tuesday last, the report of the Committee on the World's Fair was received and adopted, as follows:

That the World's Fair Convention be held in this city on Thursday, the 11th day of September next.

Each State organization and each county government to have a representation of five (5) delegates. Each local organization two (2) and each newspaper in the State one (1) delegate.

The Governor of the State, the State World's Fair Commissioners and their alternates, the Mayor of each city, or the Chairman of each Town Council or Board of Trustees, and the Chairman of each County Board of Supervisors, to be delegates, ex-officio.

That all commercial and industrial organizations; all art, scientific and educational institutions; all Chambers of Commerce and Boards of Trade, State and local; all societies of California Pioneers; all Parlor of the Native Sons and Native Daughters of the Golden West; the State Board of Agriculture and District Agricultural Societies; the State Board of Horticulture and County Horticultural Societies; the State Board of Silk Culture; the State Board of Viticultural Commissioners and County Viticultural Societies; the State Mining Bureau; the Patrons of Husbandry; all World's Fair associations which may be now or hereafter formed; all County Boards of Supervisors and all legislative bodies representing cities and towns in this State, be invited to send delegates.

We recommend that an assessment of \$1 be levied on each member of the convention, on Tuesday, June 3d, to defray expenses of printing, etc.

An amendment was adopted to the effect that the president, or, in his absence, the vice-president of each commercial organization throughout the State, be requested to act as delegate ex-officio to the World's Fair Convention.

A. T. Hatch offered the following resolution, which was adopted by a unanimous vote:

That the Honorable United States Commissioners for California of the World's Columbian Exhibition be and are hereby respectfully requested when they meet to arrange for awarding premiums to urge upon their fellow-commissioners that any individual exhibitors who may place their exhibits in the State collective

displays may compete for premiums on the same footing as individual exhibitors outside of State collective exhibits.

In addition to this, a San Francisco World's Fair Association was decided upon to represent the city and county of San Francisco.

Mayor Pond has appointed the following committees:

Committee of Arrangements for the State Convention to be held September 11th, in accordance with the plan decided upon by the General Committee—Col. C. L. Taylor, Chamber of Commerce; Major James D. Phelar, Art Association; Colonel William Harney, Manufacturers' Association; J. Q. Brown, State Board of Trade; E. W. Newhall, San Francisco Board of Trade; C. B. Binschn, State Board of Viticultural Commissioners; Homer S. King, San Francisco Stock Exchange; B. M. Lelong, State Board of Horticulture; W. L. Locke, Canned Goods Association; Irving M. Scott, Engineers and Iron Founders' Association.

Committee to Incorporate San Francisco's World's Fair Association—George W. McNear, Chamber of Commerce; M. M. Estes, State Board of Trade; Colin M. Boyd, Board of Supervisors; Colonel A. G. Hawes, Art Association; Isidor Jacobs, Canned Goods Association; A. W. Scott, Mechanics' Institute; A. S. Halliday, Manufacturers' Association; Jules Cerf, San Francisco Board of Trade; B. F. Bissett, Produce Exchange; C. Carpy, Wine Dealers' Association.

Auriferous Gravels of California.

In this number of the PRESS is given the concluding article of the series written by Henry G. Hanks on the auriferous gravels of California. The theory propounded by Mr. Hanks is at variance with the generally accepted one as to their origin, but he has given the reasons on which he bases his conclusions. Mr. Hanks' articles have interested very many of our readers, who will be still further interested by subsequent articles from the pens of others who do not agree with his ideas. We shall be glad to hear from any one who can contribute any facts bearing on the subject one way or the other.

The fact is that there is very little reliable data concerning our gravel mines. Few seem to have taken the trouble to make any permanent records. Take, for instance, the drifting districts of the Forest Hill ridge or divide, in Placer county. The earliest developments in this section (covering about 25 miles of the gravel channel) were confined to the more accessible portions of the beds. The amount of gold produced has been estimated at from \$25,000,000 to \$30,000,000, and the greater part of the ridge remains untouched. Many of the claims being worked out or proving unprofitable, were abandoned and the openings have been filled up by caving.

Information which has cost large sums of money to obtain, and which might have furnished a valuable guide in subsequent undertakings, was lost for want of a proper record. It has been necessary to repeat a great deal of prospect work merely to test the memory of predecessors.

Of late years a number of bolder enterprises have been started with the object of attacking the more deeply buried portions of the ancient gravel-channel system. It is difficult to obtain reliable data, and large expenditures have been made in determining the location, course and depth of channels. It is not unusual for a company to expend \$100,000 or more before determining the exact location or even the existence of a pay channel within the boundaries of its property. Two contributions on the subject of the auriferous gravels are promised the PRESS, and we shall hope to receive others.

ACADEMY OF SCIENCES.—At the meeting of the California Academy of Sciences, on Monday evening, the following donations to the cabinet were reported: Five hundred and eighty-two specimens of fish from the bay and coast, collected by Curator Eigenmann, one reptile, one batrachian, and four specimens of birds in flesh from L. Bolding of Stockton, and one Oregon mole from E. D. Flint of Oakland. Prof. J. S. Brandegee, who recently returned from a visit to Santa Catalina island, on the southern coast of California, showed a fine photographic view of the island, and gave a brief description of its beautiful scenery and its topographical features. He also spoke of its flora and fauna, and asserted that the island has the finest and best sheltered bay on the coast, excepting San Francisco.

JOHN FORD, one of the oldest residents of Grass Valley, and well known in mining circles all over the coast, died on Monday. He

was foreman of the Allison Ranch mine as long as that famous property was in operation. The deceased was about 60 years of age.

Tree Growth in a Gravel Mine.

The out shown on the first page is a photograph of a view taken by W. R. Nitting in one of the old abandoned hydraulic mines at Gold Run, Placer county. A landscape of this nature can be seen by the travelers on the Central Pacific railroad from the car windows. The photograph is reproduced here to call attention to the growth of young pines which has sprung up since the mines stopped work. Although the material is very unpromising for any plant growth, the soil having been washed away, these young trees are thrifty and vigorous and have attained a good size.

This is an evidence of how rapidly Nature will reproduce the forests of the Sierras, even under unfavorable circumstances. Of course in this instance no planting has been done by man, and no care has been given the young trees. In fact, one of these old hydraulic mines—a mass of boulders, cement and gravel—is about the last place in which any one would expect trees or plants of any kind to thrive. Possibly if people tried to cultivate anything there they would be unsuccessful; on the principle shown in the starting of a lawn in a suburban town where a carefully prepared plot, watered and seeded, has to be coaxed and cared for, while everything will grow luxuriantly in the walks where it is not wanted and gravel has been placed.

The question of forest culture, although now talked of and considered, has not as yet become as important with us as in older countries, where generation after generation has destroyed the trees in all directions. In some countries the Government has taken the matter in hand and enforced the planting of trees. Up to this time, on this coast, we have been too busy cutting them down to think much of the needs of those who come after us. The subject is, however, destined to become of more importance from now on. The State Board of Forestry is issuing bulletins of information and has established experimental forestry stations in California. The fact that the pines of the Sierras will reproduce themselves under such unfavorable circumstances as that indicated by the view, is encouraging to those interested in the subject of forest culture in this State.

Ventilation of Mines.

In the colony of Victoria they have a Board of Commissioners on the ventilation of mines, and the various superintendents give, under oath, their experience and the methods they adopt. Many of these statements are of general interest as applicable elsewhere. Geo. E. Thompson recently described a system he had devised. Tubing of requisite size is fixed in the shaft and extended to the workings. Above the surface this tubing is carried to where the exhaust steam from the engine or steam from a boiler can discharge direct into it. When the steam is not of sufficient pressure, a steam-pipe is carried through a heated chamber to increase the temperature. The bottom of the exhaust tube is closed except as to the insertion of the steam-pipe, and the top of the tube, into which the steam exhausts, is closed with a hinged door opening outward. It is computed that a 10-inch pipe and 20-inch exhaust tube, eight feet long, with engine working 180 strokes per minute, will remove air from the mine at the rate of 3000 feet per minute. A sketch of this system is given herewith. (See opposite page).

The manager of the Hercules and Eoergetic described a method he had adopted for ventilating an upraise from a crosscut. They had a shaft 10x4 feet in three compartments, and at the 700 ft. level drove a crosscut east about 255 feet and south about the same distance. Then they put up a rise 266 feet and they had a jet of water from the 540 feet, an inch pipe and an air collar of two feet. The air was got into this by a water-pipe coming down the shaft from the 540 ft. level. They put the pipes in the drive over the air-collar, which drove a current of air over the collar. At the end of the drive they put up the rise and then conveyed the pipes under the collar and up one division of the rise, and turning the pipe into the other division of the rise, the air was forced down with it. The accompanying out shows the arrangement adopted. The air was kept good in this rise by this means.

Hydrocarbon Furnace for Assaying, Etc.

[Geo. E. R. Ellis, F. C. S., of Montana, in "Journal" of the Society of Chemical Industry.]

I have ventured in this paper to give particulars of a piece of apparatus which my own experience—confirmed by that of many other assayers—has shown to be eminently serviceable as a readily controllable source of intense heat, such as is required by analysts, assayers, metallurgists, and others. This furnace has been before the American public for several years and is therefore past the experimental stage, but, so far as I am aware, it is comparatively or wholly unknown to the English scientist.

Assayers know full well that there are many inconveniences and annoyances necessarily connected with the use of furnaces burning coal or coke; this apparatus, on the contrary, does away with the constant replenishing of fuel, with all dust and ashes, and with a large

(2) Place the burner against the inlet of the furnace.

(3) Turn out burner flame with *E*, and immediately turn it on again without lighting it (or simply blow the flame out), when, if the furnace is hot enough, the gas will light inside the furnace. When burning inside the furnace, there must be no flame in the burner tube. The heat can be regulated by the use of *E* and *P*.

The tanks are made in two sizes; one contains half a gallon of oil, the other one gallon, and cost (with blowpipe complete) at Chicago respectively \$23 and \$26.

The muffle furnace is represented in Fig. 2. It is made in two sizes, the one taking a "C" Battersea muffle (8 inches long x 4½ wide x 3 high), the other an "F" Battersea (10x6x4). The inlet for the blast is opposite to, and below, the mouth of the muffle, and cannot be seen in the cut. The muffle furnace requires a length of two (not more) of stove-pipe in order

The temperature of an ordinary room at the same time was 16° C.

The general compactness of the apparatus is also a feature in its favor; the larger size muffle furnace stands 14 inches high, is nine inches wide and 12½ inches long, while the corresponding measurements for the crucible furnace, taking two crucibles at a time, are 10½, 8 and 14½ inches respectively. The whole apparatus can be conveniently used on a table four feet long by two feet three inches wide. It is also to be noticed that the burner in Hoskins' apparatus is outside of the furnace during the whole of the operation and is, therefore, not subjected to the destructive influence of very high temperatures, as is the case in many forms

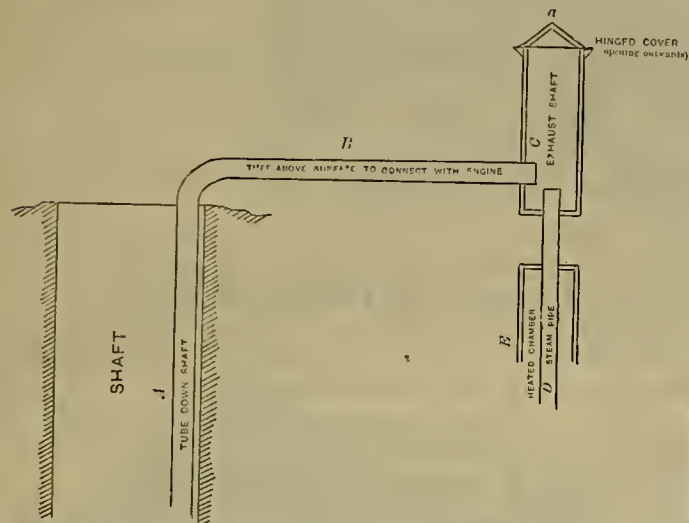


FIG. 1.—SKETCH OF APPARATUS FOR MINE VENTILATION. (See Opp. site Page.)

amount of radiated heat; indeed it may be said that it possesses all the advantages of a gas furnace, with the additional advantage that it may be forced to practically any extent without the use of a blower or foot-hellows. Once pumped up—which operation occupies only a few seconds—the blast will continue for a long time without further attention.

The apparatus consists of three parts (each of which may be procured separately), viz.: The tank and blowpipe, the muffle furnace, and the crucible furnace. The tank and blowpipe are represented in Fig. 1. *P* is an ordinary force-pump at the bottom of which, at *A*, is a valve which closes automatically upon releasing the pressure from the pump. *C* is a check-valve which closes the inlet to the tank *T* completely; *F* is a filling screw for introducing the fuel used, viz., gasoline; *V* is a vent screw for letting off the pressure when the operation or experiment is finished; *H* is a pipe leading from the tank to the burner *D*; *E* is the burner-regulator, terminating in a fine point, closing the orifice of the burner; *S* are packing-boxes. Upon opening *C* and pumping a few strokes, a pressure is created in the tank and on top of the fluid, forcing it through the tubes of the burner, which being previously heated, vaporize the gasoline. This issues from the orifice at the end of *E* as a highly heated gas, and burns as such in the form of a powerful blast. After being once started, the heat of the flame, passing through the burner *D*, vaporizes the fluid in the tube, and hence the apparatus is automatic.

The air which is forced in is not consumed, so that to keep up the blast it only requires a few strokes of the pump occasionally (every half-hour or so) to maintain the pressure lessened by the consumption of the gasoline.

The way to start the blowpipe is simple and as follows: Close *E*, unscrew *F* and introduce gasoline according to the capacity of the tank. Replace *F*, close *V*; open *C* one or two turns, and give three or four full strokes of the pump *P*, then close *C*. Heat the burner by burning some of the gasoline in a suitable vessel (an old scroffler will do well) placed under the burner; when hot, apply a match and open *E* gradually until the action is more or less uniform. The burner is hot enough when no liquid or spray issues from the orifice; if not hot enough, let the oil burn slowly until no liquid or spray issues. When sufficiently heated, the blast can be made of any desired intensity by the use of the force-pump as above. The mouth of the burner *D* should be 2-3 inches from the inlet of either furnace, otherwise the combustion in the interior of the furnace will not be complete. To stop the action of the blowpipe, simply shut the regulator *E* or open screw *V*, or do both. When not in use, keep *V* open.

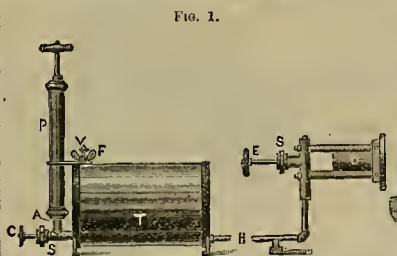
For very high temperatures on muffle work we proceed as follows:

(1) Light as above, and heat inside of furnace to bright redness.

to create a draught through the muffle, or they may be connected with a flue; in the latter case, a damper must be put in the pipe, for too much draught is prejudicial.

The smaller muffle costs \$10; the larger one \$15.

Figs. 3 and 4 represent the two kinds of crucible furnace, Fig. 3 being adapted for taking one crucible at a time; Fig. 4 for taking two or four crucibles at the same time. The No. 1 furnace costs \$4 and takes a crucible 4 inches in diameter and 5½ inches deep inside; No. 2 takes a crucible 5 inches in diameter and 6½ inches deep inside, and costs \$5; No. 3 costs \$7 and takes two crucibles 4 inches in diameter, while No. 4 costs \$12, and can take four No. 10 French crucibles, or equivalent sizes.



We will now consider some of the conveniences attending the use of this apparatus.

Cost of Running.—This naturally depends upon the local price of the fuel used as the source of heat, viz., gasoline. In a large city, e. g., Chicago or New York, the cost per hour does not exceed 3 cents, while 5 cents may be put down as the maximum in out-of-the-way districts. A certain prejudice exists against the use of gasoline, but, from its construction, no accidents can happen from use of this apparatus save as the result of gross carelessness.

Power of Furnaces.—The heat of the blowpipe can be controlled from that of a Bunsen burner to that required to melt cast iron. Using the crucible furnace, ½ pound of cast iron can be melted in 15 minutes (furnace cold at the start), or 1 pound of brass can be melted in 7 minutes (furnace hot at the start). The muffle furnace can be heated to a scorification temperature in 15 minutes. Six scorifications can be performed at the same time in the larger furnace.

Amount of Heat Radiated.—In this respect these furnaces will compare favorably with any in the market. The following readings were taken with the larger size muffle furnace during the scorification of some copper-silver ores:

Distance from Side (or Front) of Muffle.	Temperature.	Distance from Side of Muffle.	Temperature.
5 ft. (front)....	17° C.	9 in. (side)....	42° C.
22 in. " "....	21° C.	6 in. " "....	52° C.
13 in. " "....	28° C.	3 in. " "....	81° C.
19 in. (side)....	28° C.	1 in. " "....	103° C.
12 in. " "....	34° C.		

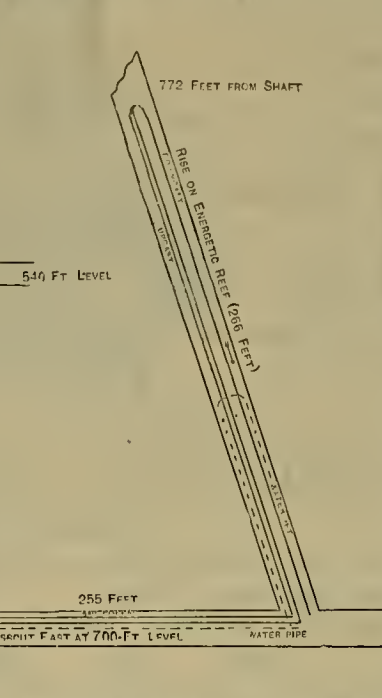


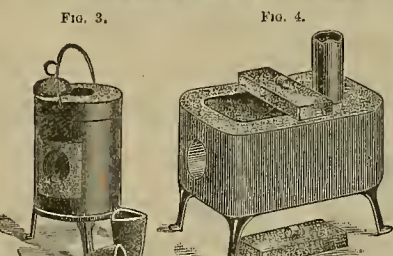
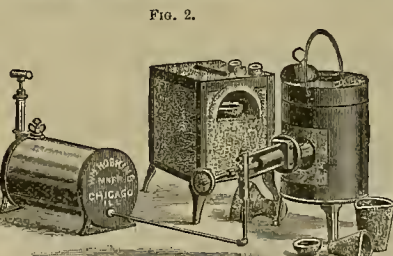
FIG. 2.—VENTILATING AN UPRaise.

of furnaces using ordinary coal-gas as a source of heat.

Note.—Since writing the above I find that a muffle furnace is now manufactured sufficiently large to accommodate a 15 inch by nine inch muffle. This furnace is heated by two blowpipes of the same size and power as described in the above paper.

This apparatus may be obtained from the manufacturers, Wm. Hoskins & Co., 81 South Clark street, Chicago, or from dealers in assayers' supplies.

THE STEAMBOAT MINE CASE.—The case of W. H. Bullock and others against the Mayflower Gravel Mining Company was this week transferred from the Superior Court of Placer



HOSKINS' HYDROCARBON ASSAY FURNACE.

county to the United States Circuit in San Francisco. Bullock and others seek to recover possession of the Steamboat placer mine, located in Placer county, near Forest Hill, besides \$1000 damages and \$50 000 rent for use of the mine, which, they claim, they were unlawfully dispossessed of. The directors claim that the mine was purchased by them in good faith from the Central Pacific Railroad Co.

A HANDSOME VIEW of the city of Tacoma has been published on a very large sheet by Will Carson. Accurate sketches of the buildings and the general surroundings give a very good idea of the city and its location.

Mines and Mills of Shasta County.

NUMBER IV.

[From our Traveling Correspondent.]

After returning to Shasta from Iron Mountain, I was somewhat at a loss as to my next move, whether to go to Old Diggings or French Gulch, but after talking with some of the old settlers concluded to go to Old Diggings as being the liveliest and finest part of Shasta's mining labor. Old Diggings is on the east side of the Sacramento river, the upper part being about 10 miles from Redding and the lower about six. It is one of the celebrated localities of the olden time for gold. Its placers were immensely rich, and even to this day, when there is a hard rain, the miners turn out and make fair wages washing in the ravines and old gravel-beds. At the present time quartz mining takes the lead, and for quartz it is wonderfully prolific. There are quite a number of mills.

Passing over from Copley, you first reach the Hart & Flemming mine and mill. Copley is a railroad station and is one of the depots for Squaw Creek. There is here a postoffice, telegraph and store, also hotel, both of the latter being kept by W. W. Nickols, an old Nevada Co. man. Mr. Nickols knows all about the mines, and can tell you where you can find a good prospect for a fortune, and will put himself out of the way to accommodate you, even to the extent of peddling you across the river, as he did your correspondent, because he asked too many questions.

The Hart & Flemming mine is a fine property. The ore carries about one per cent of sulphurets, which are very rich in gold—and free gold as well. The lode is opened by several tunnels, the upper ones, however, being about worked out. The lowest tunnel gives a development of near 500 feet below the crown of the mountain, and is the lowest work now in the district, and rather settles the point as to the lode going down. As to the matter of the lodes going down—where do they come from? If from below, why not go down? No matter which theory is accepted, that of fire or water, the commencement must be below.

The deeper they have gone on this lode the better it is; the lode varies from two to eight feet in width. The mine at times furnishes very rich specimens of gold and sulphurets.

The mill consists of a Dodge pulverizer and two of Hendy's Triumph Concentrators. They work very coarse, using about No. 30 screen; they work thus mainly for concentrating; most of the ore and all the concentrates are shipped to Selby's Works. There is nothing about this ore, as I see it, that should prevent its being worked on the ground. The fact that most of it will bear shipment expenses is a good card for the mine, but the fact that they do ship is not so good a card for the owners, but that is their business.

There is one remarkable feature connected with this property. It belongs to and is superintended by two preachers. How a preacher can run a quartz mill and mine, and not at times do some tall swearing, will puzzle many superintendents. At the time of my visit Mr. Hart was absent, but Mr. Flemming, by his very courteous manner, impressed me very favorably as an intelligent gentleman.

Next on the line is the Mammoth mine, now bonded to Myers & Co. of San Francisco, who are doing prospecting work prior to purchase. This lode is large, being from 6 to 16 feet in width; there is any amount of quartz, and some of it looks well. They are running a tunnel and are in some 700 feet, which will give some 200 feet of backs. Some mills stop for the want of quartz, but the owners of a 40-stamp mill here would never live long enough to see the last of this. As to the value of the quartz, that can speak for itself.

The view from these high ranges is very fine, all rugged and broken, and all more or less timbered with scrubby oaks and pines, etc. It looks as though it were made for mines.

FATAL RAILROAD ACCIDENT.—On Friday of last week an engine and one car of the South Pacific Coast R. R. Co. ran off the bridge at Oakland creek, through the open draw, and 13 persons were drowned. The coroner's jury charges the engineer with manslaughter and censures the company for not adopting proper measures of safety in the matter of signals at the drawbridge.

THE WELLINGTON COAL MINES.—Advices from Victoria, B. C., are to the effect that the situation at the Wellington mines remains unchanged, and the prospects are that the mines will be closed down indefinitely. The steam collier Costa Rica, which depended upon the mines for a cargo, is doing nothing. Her crew, including the captain, have been paid off and discharged.

CEDEOS ISLAND ORE.—The steamer Pomona brought to San Francisco this week from San Diego 100 tons of ore taken out of the mines on Cedros Island, off the coast of Lower California. The mines on this island have not been worked for a number of years until a short time ago, when they were again started. The ore was shipped to San Diego by the steamer Carlos Pacheco.

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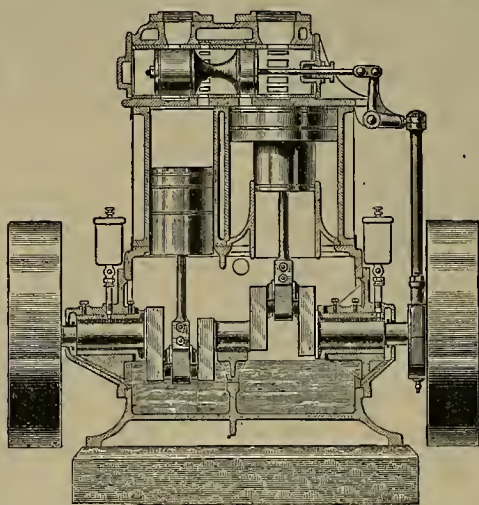
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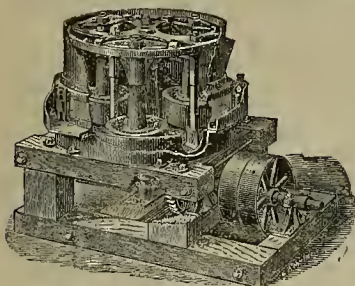
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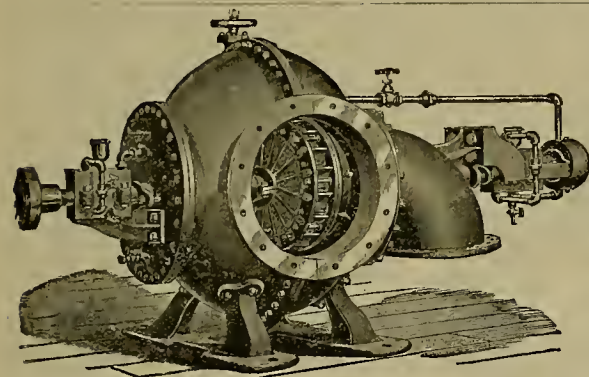
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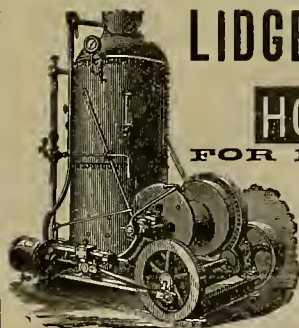
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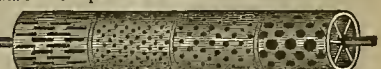
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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, June 5, 1890.

General trade was only fair the past week. The unfavorable influences heretofore reported—tariff and silver legislation—are still felt. The light supply of near-by and spot tonnage is also cause for conservatism, owing to the belief that wheat will move slow for the first three months of the new-crop season, which will make close collections.

The money market continues easy, but there is a growing impression that there will be considerable stringency in August and September, owing to the demand for crop purposes and the light return remittances until toward the forepart of October. Considerable money is being disbursed for improvements—building, etc.—in this and adjoining cities, and liberal disbursements are being made for railroad building, repairs, and other interior improvements.

The steamer leaving here for Hong Kong, June 4, took out \$307,632 in Mexican dollars and \$13,727 in gold coin.

MEXICAN DOLLARS—There was a fair demand for shipment by the last outgoing steamer to China. The market has held steady at 80¢@81c, closing firm.

SILVER—Adverse and bear reports regarding prospective silver legislation had an unfavorable influence on the market at the East and also in Europe. Although everything was done to depress the market, bimetalists did not lose faith, but on the contrary felt more confident that the unfavorable criticism regarding the possibility of no silver legislation would be the means of bringing about a free coinage Act. Our Washington advices indicate that a vote in the Senate on the silver bill will probably be reached during this month, and that in July the bill will be passed. It is confidently asserted that Congress will not ignore the demand of the country, which is unmistakably in favor of free coinage. With free coinage in this country and the Comstock mines yielding nearly all gold, it will be only a short time before the European Governments will fall into line and favor bimetalism. It is asserted by those who should know that European capitalists reading the signs of the times are investing in mining property in this country. A private letter from J. B. Farish, mining engineer, Denver, Colorado, states that he is kept exceedingly busy in reporting on mines, and that English capitalists are paying more than ever before. This shows the present drift of affairs. It is claimed that the Rothschilds have been investing on this coast.

In the local market silver shaded off to \$1.03, then to \$1.02½, but at the close the tendency is upward under higher prices abroad. Exporters named \$1.03 to-day, which would cause the Mint to pay more on a firm selling offer.

Private cables received to-day from London quote silver at 47½d, which is quite an advance on yesterday's price of 46½d. New York came through at \$1.03½.

QUICKSILVER—Receipts the past week aggregate 223 flasks, and exports by sea 30 flasks to Auckland and 58 flasks to Mexico. The market continues firm. The home or coast consumption is reported large.

LIME—Receipts the past week aggregate 6380 bbls., and exports 50 bbls. to Honolulu. The demand shows a slight increase. The market is easy.

BORAX—Exports by sea the past week aggregate 63,780 lbs. to Liverpool. The market is barely steady. Some concessions are reported to large buyers.

ANTIMONY—The local works are running to full capacity and turning out about 750 lbs. a day. The market is easier under better supplies.

IRON—The market is overstocked, but large holders are not disposed to make much if any concessions. The consumption is enlarging. The East and Europe report firmer markets. Imports the past week aggregate 250 tons from New York.

LEAD—The market holds strong. Our Eastern advisers report consumers buying in a small way, but holders are firm in their views. The speculative movement was, at last advices, less pronounced.

TIN—The market continues strong, with a good home consumption. The quantity used this year will not vary much from that of 1889. The East reports an uncertain, hesitating market, yet the tone was steady. English cables report plate active, with the market stiffer.

COPPER—Exports by sea the past week aggregated 31 ingots to Hamburg. The home demand continues free at full prices. The East is reported as follows: The consumptive demand is represented as being phenomenal, and absorbing the product of the mines so closely that the mining companies or other holders will consider offers at the last prices quoted where deliveries further ahead than August are asked for. Quite a large block of Arizona ingot has been disposed of at \$13.90@13.95c, and 14c is now a strictly inside price for that class of material. Common casting brands were sold at \$13.35@13.40c during the week, but at the close 13½c seemed to be the lowest at which any could be secured. Our private cables state that French holders are still realizing in the foreign markets, but prices there continue to advance, and merchant bars are up to \$14.55@14.60c in London.

COAL—Imports of coal the past week aggregate as follows: Coos Bay, 150 tons; Seattle, 4560; Comox, 4300; Tacoma, 4000; Newcastle, N. S. W., 3325; Nanaimo, 1300; Kobe, 1750; Departure Bay, 2260; total, 22,595 tons. The market for spot is steady at unchanged quotations. The demand for steam is active. The strike in the Wellington mine is still on. For Australian, importers' views are strong, but buyers do not appear disposed to operate much for distant shipments unless offered concessions. Some offer \$7. Importers ask more, by from 12½c to 25c a ton.

Always Take a Receipt.

Subscribers to this paper are earnestly requested to take a receipt for every payment made on subscription, no matter how small the amount or to whom paid. We use printed receipts, with stubs attached, to prevent mistakes, through carelessness (or other reason), by agents or others. For our mutual interests take a receipt, whether you preserve it or not.

Eastern Metal Markets.

By Telegraph.

New York, June 4.—The following are the closing prices the p-m week:					
	Silver in	Silver in	Copper.	Lead.	Tin.
Thursday	40½	1 (2)	\$15 25	\$4 32	\$21 30
Friday	40½	1 01½	15 25	4 30	21 00
Saturday	40½	1 01½	15 25	4 30	21 00
Sunday	40½	1 01½	15 25	4 30	21 00
Tuesday	40½	1 01½	15 25	4 30	21 00
Wednesday	40½	1 01½	15 25	4 30	21 00

New York, June 3.—Quicksilver steady at 72¢@74c.

Borax steady; \$3.90 for California refined and powdered.

Copper quiet, firm; Lake, ingot, 15¢@16½c; spn, 15¢@15½c.

Future Arizona, 14c; casting, 13½c; London, strong.

About 500 tons of pig lead sold for use at 84.25¢@84.30c to speculative inquiry.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, June 5, 1890.

ANTIMONY.....	21½	22
BORAX—Refined, in carload lots.....	8	8
Powdered.....	8	8
Concentrated.....	7½	7½
All grades jobbing at an advance.		
COPPER.....	23	25
Bull.....	23	25
Sheathing.....	23	25
Ingot, jobbing.....	17½	18
do, wholesale.....	16	18
Fire Box sheet.....	23	25
LEAD—Pig.....	4½	5
Bar.....	5	5
Sheet.....	7	7
Spoke, discount 10% on 600 base Drop, pig bag.....	1 55	60
Buck, pig bag.....	1 75	60
Chilled, do.....	1 05	60
TINPLATE—E. V. steel grade, 14x20, to arrive.....	4 75	60
B. V. steel grade, 14x20, to arrive.....	4 75	60
Charcoal, 14x20.....	6 00	60
do, roofing, 14x20.....	12	60
do, do, 20x23.....	12	60
Pig tin, spot, pig bag.....	13 50	60
Coke—Eng. ton, spot, pig bag.....	13 50	60
do, do, to load.....	12 00	60
QUICKSILVER—By the flask.....	57 00	68 00
Flasks, new.....	35	60
Purest Standard, 14x20, spot.....	10 00	60
CROCKERY—Iron, 3x4.....	3	34
IRON—Bar, base.....	42	54
Norway, base.....	42	54
STEEL—English, lb.....	16	20
Cast iron, tool.....	8	9
Black Diamond tool.....	8	9
Pick and Hammer.....	8	10
Machinery.....	4	5
Tool Calk.....	4	5
IRON—Glengarnock ton.....	35 00	—
Exglinton, ton.....	35 00	—
American Soft, No. 1, ton.....	35 00	—
Oregon Pig, ton.....	35 00	—
Coke—Eng. ton, spot, pig bag.....	35 00	—
Clay Lane White.....	27	60
Shotts, No. 1.....	35 00	35 00
Bar Iron (base price) pig lb.....	—	—
Langdon.....	35 00	—
Cast iron, tool.....	8	9
Black Diamond tool.....	8	9
Pick and Hammer.....	8	10
Machinery.....	4	5
Tool Calk.....	4	5
Per Ton.....	—	—
Australian.....	7 25	7 50
Liverpool Steel.....	8 00	8 00
Scottish Splint.....	8 00	8 00
Cardiff.....	8 50	9 00
Per Ton.....	—	—
Wellington.....	9 00	9 00
Greta.....	9 00	9 00
Westminster Brymbo.....	9 00	9 00
Nanaimo.....	9 00	9 00
Sydney.....	9 00	9 00
Gillman.....	9 00	9 00
Per Ton.....	—	—
Canadian Anthracite Coal.....	—	—
Egg, ship side.....	12 50	12 50
Egg, yard.....	15 00	15 00

Coal.

Per Ton.

Australian.....	7 25	7 50
Liverpool Steel.....	8 00	8 00
Scottish Splint.....	8 00	8 00
Cardiff.....	8 50	9 00
Per Ton.....	—	—
Wellington.....	9 00	9 00
Greta.....	9 00	9 00
Westminster Brymbo.....	9 00	9 00
Nanaimo.....	9 00	9 00
Sydney.....	9 00	9 00
Gillman.....	9 00	9 00
Per Ton.....	—	—
Canadian Anthracite Coal.....	—	—
Egg, ship side.....	12 50	12 50
Egg, yard.....	15 00	15 00

Mining Share Market.

The market opened weak on Monday, and under fair selling by the outside public, prices shaded off up to Tuesday morning, when a better tone set in, with a demand for Potosi and Bullion. Wednesday witnessed more activity, with Potosi and Bullion still climbing. Following in their wake came Exchequer, Chollar and Savage. The remaining stocks did not show much activity, but strengthened slightly in sympathy. There were unmistakable signs that the pool was still in the market, for notwithstanding bull points on the street, they were not able to sell but hard to buy, so as to sustain the market and advance quotations toward the close. The market has a healthy look for an upward move, but how much, the writer can form no idea, not being on the inside. The upward move is based on concentrated stocks and assessments to be collected preparatory to others later on.

In outside stocks, dealing the past week was light in the Tuscaroras, but at steady prices. In the Bodies, nothing was done. In Peer, Central, Crocker and Peerless of the Quilotoa group, trading was also light. Judging from appearances, it looks as if a movement is near at hand in the Tuscaroras under the new control, for Grayson Sr. should do something in that direction in consideration of giving his son so many secretarieships; besides, the roads in that district are in good condition, and summer is when they generally deal the stocks.

This week's official letter from Hale and Norcross reports running into porphyry and quartz carrying some water. This acknowledgment of a strike, even if it is water, must be a source of gratification to stockholders. If some of the superintendents could be induced to carry some water, perhaps we would have more intelligent reports from the mines.

From the Comstock mines our advices contain of the most gratifying character. Drifts and crosscuts are the order of the day. It looks as if several of the mines are being put into position for better working, perhaps to show up the ore body found to the west. While we are not able in this issue to give any particulars further than heretofore published by us, yet our correspondent is more hopeful than ever of the result. He states that it is the intention to sink the Potosi winze to the 1100 level before drifting. In sinking this winze this stock will be more of a gamble than ever, for the character of the ore in the winze is liable to change every few feet. If, in sinking, the ore should be richer and wider, then the proposition is for a mine; but if poor ore and porphyry come in, then future work only can demonstrate "what is what."

Work from the Ward Shaft is being vigorously

MINING SHAREHOLDERS' DIRECTORY.

COMPILERS EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS

ASSESSMENTS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Acme M & Co.....	California, 10.	3.	Mar 20.	June 23.	J. M. Bullington.	339 California St.
Belcher M Co.....	Nevada, 39.	50.	Apr 23.	June 3.	C. L. Perkins.	329 Pine St.
Best & Belcher M Co.....	Nevada, 46.	25.	May 17.	June 17.	J. S. O'Brien.	809 Montgomery St.
Bodie Tunnel Co.....	California, 16.	25.	May 21.	June 25.	J. S. O'Brien.	809 Montgomery St.
Challenge Cons M Co.....	Nevada, 16.	50.	May 14.	June 17.	C. L. McCoy.	329 Pine St.
Confidence S M Co.....	Nevada, 16.	75.	May 10.	June 13.	J. A. Groth.	414 California St.
Cons Imperial M Co.....	Nevada, 27.	15.	Apr 17.	June 22.	C. L. McCoy.	329 Pine St.
Cons New York M Co.....	Nevada, 3.	15.	Apr 22.	June 26.	J. C. Elliott.	309 Montgomery St.
Dot Monte M Co.....	Nevada, 3.	20.	Apr 15.	May 23.	J. W. Pew.	310 Pine St.
Fond Treasure M Co.....	Nevada, 6.	25.	May 23.	June 27.	J. S. Stoddard, Jr.	309 Montgomery St.
Gold Hill M Co.....	California, 9.	25.	Apr 17.	May 24.	C. A. Grass.	Phelan Block
Gould & Curry M Co.....	Nevada, 64.	30.	Apr 28.	June 3.	A. K. Durbin.	309 Montgomery St.
Holmes M Co.....	California, 17.	25.	May 13.	June 30.	J. J. Bullington.	309 Montgomery St.
Holmes M Co.....	Nevada, 16.	25.	May 13.	June 24.	J. C. Elliott.	309 Montgomery St.
Kentuck M Co.....	Nevada, 21.	30.	Apr 29.	June 3.	J. W. Pew.	310 Pine St.
Locomotive M Co.....	Arizona, 7.	5.	May 1.	June 4.	J. A. H. Feh.	309 Montgomery St.
Mexican M Co.....	Nevada, 40.	25.	May 13.	June 15.	J. C. Elliott.	309 Montgomery St.
Moraine Star Cons M Co.....	Arizona, 1.	2.	Apr 30.	May 31.	J. W. Pew.	310 Pine St.
North Commonwealth M Co.....	Nevada, 3.	25.	Apr 16.	May 21.	J. W. Pew.	310 Pine St.
Occidental Cons M Co.....	Nevada, 6.	25.	Apr 28.	June 6.	J. A. K. Durbin.	309 Montgomery St.
Peerless M Co.....	Arizona, 5.	10.	Mar 23.	Apr 30.	A. Waterman.	309 Montgomery St.
Seg Belcher & Mides Cons M Co.....	Nevada, 6.	30.	May 5.	June 15.	E. B. Holmes.	309 Montgomery St.
Sierra Nevada M Co.....	Nevada, 37.	50.	May 13.	June 15.	E. L. Parker.	309 Montgomery St.
Silver Hill M Co.....	Nevada, 26.	10.	Apr 14.	May 20.	J. C. Bates.	309 Montgomery St.
Standard Cons M Co.....	California, 3.	50.	June 2.	July 15.	A. J. W. Pew.	310 Pine St.
Teresa M Co.....	Mexico, 1.	10.	May 9.	June 13.	J. A. Chennant.	329 Montgomery St.
True Cons M Co.....	California, 1.	25.	May 26.	July 21.	J. C. Bates.	434 California St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING DATE
Bodie Cons M Co.....	California, E. L. Burling.	309 Montgomery St.	Annual.	June 10
Holmes M Co.....	California, J. C. Elliott.	309 Montgomery St.	Annual.	June 10

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Champion M Co.....	California, J. W. Wetzel.	322 Montgomery St.	Jan 20.	25.	Apr 5
Candelaria Cons M Co.....	Mexico, G. Gato.	309 Montgomery St.	25.	30.	May 15
Caledonia M Co.....	Nevada, A. S. Chennant.	329 Montgomery St.	25.	30.	May 15
Cons California & Va M Co.....	Nevada, A. W. Havens.	309 Montgomery St.	25.	30.	Feb 10
Derbees Blue Gravel M Co.....	California, T. Wetzel.	322 Montgomery St.	40.	40.	Apr 24
Diablo M Co.....	Nevada, J. H. Heath.	319 Pine St.	2.	2.	Oct 23
Pacific Borax Salt & Soda Co.....	California, A. H. Clough.	230 Montgomery St.	1 00.	1 00.	June 10

pushed. From a reliable source we are advised of an important strike on the 500-foot level in Hale and Norcross. Another equally as reliable party states that on the 1200-foot level in Chollar they have a large ore body averaging across its face \$40 a ton. The official letter from Savage reports that the 1300-foot Hale and Norcross drift has been extended 20 feet into the former's ground and was in a fine body of quartz giving from \$7 to \$16 assays. The official letter from Belcher reports active prospecting of a promising character. In Challenge, Confidence and Cons. Imperial, similar work is being done, with favorable results looked for.

Our correspondent speaks very hopefully of the work going on in the North End mines, and predicts something important in that group. The official letter from Overman reports that they milled, last week, 1176 tons of ore at the Brunswick mill, giving \$21.31 battery assays, of which \$13.84 is in gold; and 64 tons milled at the Vivian mill gave \$24.04 a ton, of which \$14.98 was gold. They shipped three bars of bullion on May 19 and 22, valued at \$13,769. The increased crushing at the Brunswick mill proves that our statement that 40 stamps would drop on the Overman ore was correct. It would be singular if Overman should pay a dividend. Important work is going on in Seg. Belcher and also in Caledonia.

Boise City, Capital of Idaho.

Now that Idaho is about to be admitted as a State, the people of the State are known to be the third richest precious mineral-producing State, its output being seventeen million annually. But it is not so generally known that Idaho has a delightful climate, is a stock-growers' paradise, and a great farming and lumber producing country. Special attention is called to the card of the Board of Trade, Boise City, Idaho, in another column, soliciting capital and skill to develop their resources.

Utah's Mines.

The Real Estate Exchange of Salt Lake City, Utah, desires to enter into correspondence with Mining Men and Capitalists. The purpose is to encourage the development of the mining interests of Utah. For years the output of Utah mines has been light to ten millions per annum, and the field is not much developed. A point made is that native coal now produces the coke used, a very important item. It is encouraging to outside capital that Utah reaches out a helping, friendly hand. Detailed information will be freely furnished on application to the Real Estate Exchange of Salt Lake City.

BOISE CITY, CAPITAL OF IDAHO.

Metropolis and by provision of Constitution Permanent Capital. Unusual opportunities for investment and business. Capital needed. Mortgages net 10 percent. Saw mills, brick kilns, woolen mills, iron works wanted. Unlimited water power. Best society schools, churches, perfect climate. Stock growers' paradise. Free Government Land. Gr. at grain, fruit and vegetable country. Field crops net \$25 p acre. Idaho, "Gem of the Mountains," will soon be a State. Third in precious minerals. Output last year, \$17,000,000. Combine business with pleasure and visit us. Excursion rates.

IDAHO, "GEM OF THE MOUNTAINS."

Idaho's rapid increase in late years in mineral production is due to the scientific methods formed by capital and long experience. There is large opportunity throughout the mining districts of Idaho to develop mines with almost the certainty of large profits. Gold bullion is cashed at the Government assay office in Boise City. At the same time no mining field offers more attractive inducements to the hardy miner whose capital lies chiefly in his experience and in his pick. Full and complete information concerning Idaho mines will be mailed on application.

IRRIGATING CANALS.

Another great opportunity for capital in Idaho is in large irrigation enterprises. Projects are on foot to reclaim several hundred thousand acres, but there is room for many other such projects. Idaho has abundance of water, and the profits of irrigation are large and sure. For further details address

BOARD OF TRADE,

Boise City, Idaho.

FOR SALE—AN ONYX MINE IN SAN Bernardino County, only about three miles from Railroad. Down grade from mine to the road. Price, \$5000. NOLAN & SMITH, 34 North Spring Street, Los Angeles, Cal.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING May 15.	WEEK ENDING May 22.	WEEK ENDING May 29.	WEEK ENDING June 5.
Alpha.....	1.10	1.25	1.05	1.35
Andes.....	1.10	1.25	1.05	1.35
Belcher.....	1.30	2.11	1.50	2.00
Best & Belcher.....	2.45	3.15	2.35	2.89
Bullion.....	1.05	1.20	1.35	1.30
Bulwer.....	.55	.60	.50	.60
Commonwealth.....	3.25	4.40	3.70	4.35
Cons. Va. & Cal.....	4.10	4.45	4.00	4.55
Challenge.....	1.25	2.05	1.50	1.95
Confidence.....	3.10	5.00	3.00	5.50
Cons. Imperial.....	.30	.40	.25	.40
Caledonia.....	.40	.50	.35	.45
Crown Point.....	1.75	2.45	1.65	2.35
Del Monte.....	.75	.85	.70	.80
Exchequer.....	.50	.60	.45	.55
Gould & Curry.....	1.30	1.65	1.15	1.50
Hale & Norcross.....	1.35	2.40	1.20	2.60
Justice.....	.25	.35	.25	.35
Kentuck.....	1.40	1.60	1.35	1.45
Lady Washington.....	.65	.75	.60	.70
Mano.....	.25	.35	.25	.35
Mexican.....	2.50	3.25	2.50	3.00
Navajo.....	.25	.40	.20	.45
North End.....	.30	.45	.25	.40
Nev. Queen.....	.65	.75	.60	.75
Occidental.....	.85	1.15	1.00	1.20
Ophir.....	3.70	4.00	3.50	4.45
Overman.....	2.05	2.35	2.00	2.25
Potosi.....	2.75	3.00	2.50	3.25
Peerless.....	.25	.35	.25	.35
Peer.....	.20	.30	.20	.30
Savage.....	1.50	1.85	1.50	1.

Assessment Notices.

ACME MILL AND MINING COMPANY; Location of principal place of business, San Francisco, California. Location of Works, Amador County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 20th day of March, 1890, an assessment, No. 10, of 3 cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 11, No. 303 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of May, 1890, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 9th day of June, 1890, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
J. M. BUFFINGTON, Secretary.
Office, Room 11, No. 303 California Street, San Francisco, California.

The delinquent day of the above assessment is hereby POSTPONED to June 2, 1890, and this day of sale to MONDAY, June 23, 1890.

By order of the Board of Directors.
J. M. BUFFINGTON, Secretary.
San Francisco, May 15, 1890.

GRAY EAGLE MINING COMPANY, Location of principal place of business, San Francisco, California. Location of Works, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 1st day of May, 1890, an assessment, No. 17, of five (5) cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 11, No. 303 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 10th day of June, 1890, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 30th day of June, 1890, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
J. M. BUFFINGTON, Secretary.
Office, Room 11, No. 303 California Street, San Francisco, California.

DELINQUENT SALE NOTICE.

GOLD HILL MINING COMPANY—Location of principal place of business, San Francisco, California. Location of works, Grass Valley, Nevada County, California.

Notice—There are delinquent upon the following described stock, on account of Assessment (No. 9) levied on the 17th day of April, 1890, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. of Shares.	No. of Shares.	Amount.
Reed, William.....	141	225	\$66 25
Br e, William.....	264	31	20 25
Baily, Mrs C E.....	103	250	62 50
Baily, Mrs C E.....	100	100	62 50
Baily, Mrs C E.....	208	200	50 00
Baily, Mrs C E.....	232	252	63 00
Cohen, Henry.....	142	50	12 50
Cohen, Henry.....	288	18	4 50
Green, L P, Tr.....	377	335	84 75
Hyman, M.....	378	24	6 00
Hill, Geo W, Tr.....	351	200	50 00
Hill, Geo W, Tr.....	379	32	8 00
Jacobs, E, Tr.....	229	300	75 00
Jacobs, E, Tr.....	221	140	25 00
Jacobs, E, Tr.....	222	100	25 00
Jacobs, E, Tr.....	273	150	45 00
Kitto, W L.....	65	50	12 50
Kitto, W L.....	270	18	4 50
Levy, Morris.....	166	100	25 00
Levy, Morris.....	100	36	9 00
Myer, Roschen.....	297	231	57 75
Hilley, John.....	202	50	12 50
Riley, John.....	292	18	4 50

And in accordance with law, and an order of the Board of Directors, made on the 17th day of April, 1890, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the Company, Room 20, Phelan Building, San Francisco, California, on TUESDAY, the 10th day of June, 1890, at the hour of 2 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

C A CROW, Secretary.
Office, Room 20, Phelan Building, San Francisco, California.

A MIDDLE-AGED MAN BY THE NAME OF JOSEPH A. McLEARN, Miner, left Nova Scotia 17 years ago for California. His friends would be thankful to any person who could give any information concerning his whereabouts.

SALT LAKE CITY!

ONE OF THE GREAT FIVE.

New York, Chicago, Denver, Salt Lake City and San Francisco.

Midway between Denver and San Francisco, 700 miles from either, with no rivals north to British Columbia or south to Old Mexico, Salt Lake City is destined to become one of the great overshadowing commercial centers in the chain between New York and San Francisco.

The recent mighty inflow of the best American blood has doubled her population, begun the development of untold resources, built up strong churches of a leading denomination, created charming social conditions, fostered the public school system, directed municipal improvements and opened the most profitable business investment, manufacturing and mining opportunities ever presented by a city that in three years will contain over 100,000 people, and before the end of the century several times that number.

MORE MINING CAPITAL NEEDED.

The resources of Utah as a mining region may be shown by the following from the books of the **ONTARIO SILVER MINING COMPANY, Park City, Utah** (near Salt Lake City):

Dividend paid, No. 168, to April 1st, 1890 \$10,850,000.00; ore and bullion sold to April 1st, 1890, \$24,121,203.13. Incorporated January 1st, 1877. Capital Stock, 150,000 shares; par value of stock, \$100.00 per share; market price of stock, \$45.00 per share and upward. Average number of men employed, 425. Value of improvements and property (inventory December 31st, 1889), \$2,935,354.77.

The Company pays regular monthly dividends of \$75,000.00 or 50 cents per share. Utah has numerous dividend payers on a large scale. There are many other mines that are partly developed that promise the richest returns, with sufficient capital. Within three months, coke from our own home coal (Castle Gate) has supplanted foreign coke in our lead smelters.

Salt Lake City is now one of the most delightful homes in the world, with a perfect climate, good society, churches and schools, 50,000 population and growing rapidly. We will be pleased to correspond with mining men a capitalists and point the way to some specially inviting fields. We have many mining capitalists here, who will cordially meet and aid new men. Our field is large, there is room for all. For illustrated pamphlets, summer tourist rates, and specific information, address

Real Estate Exchange,
SALT LAKE CITY, UTAH.

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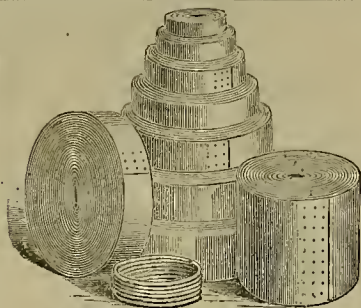
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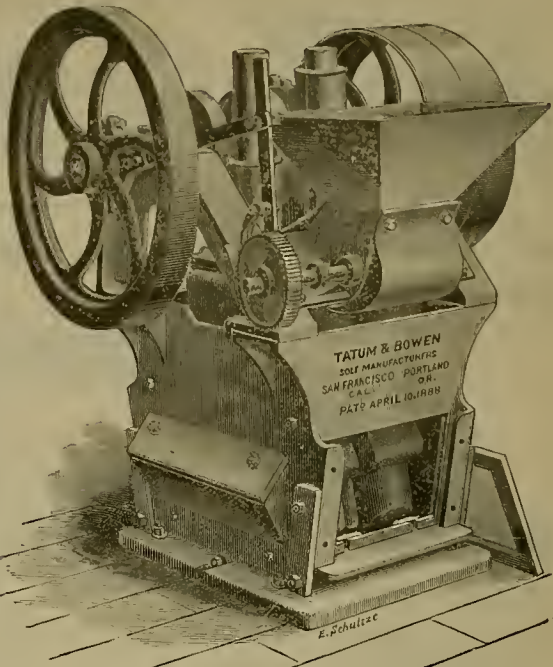
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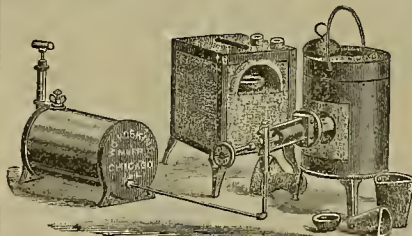
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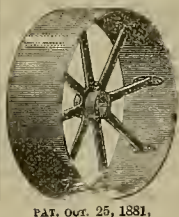
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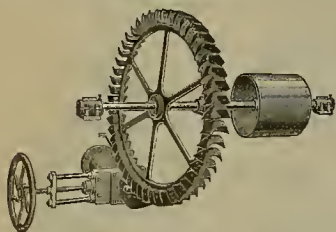
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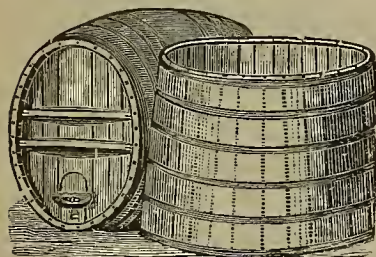
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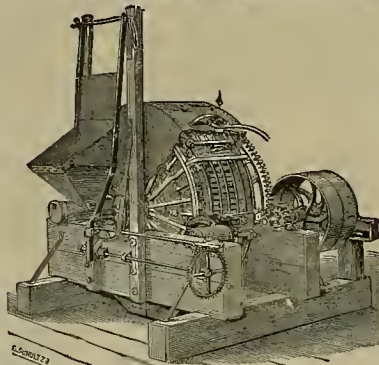
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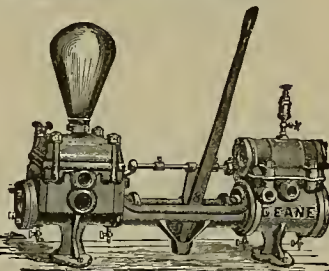
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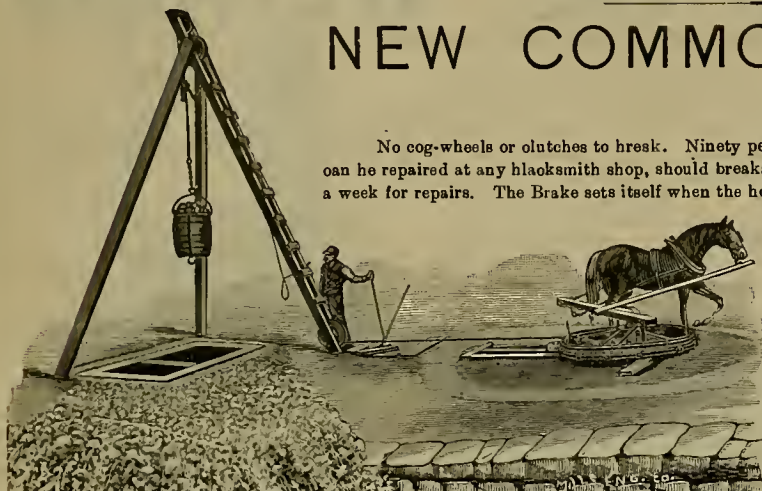
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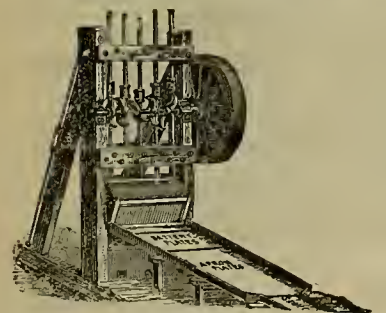
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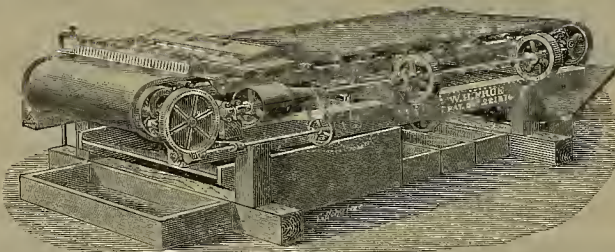
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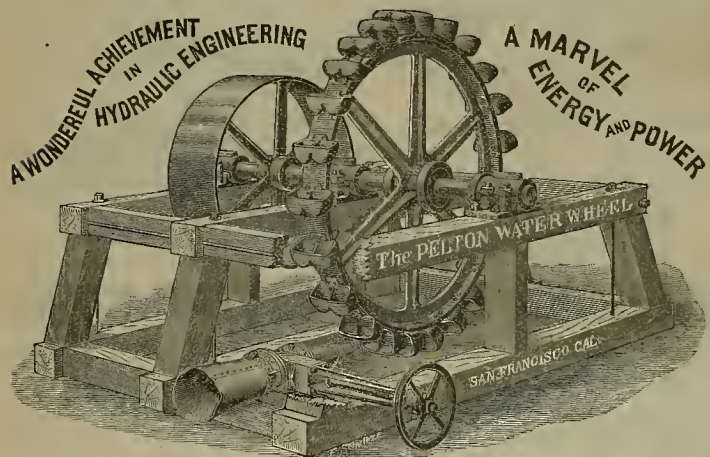
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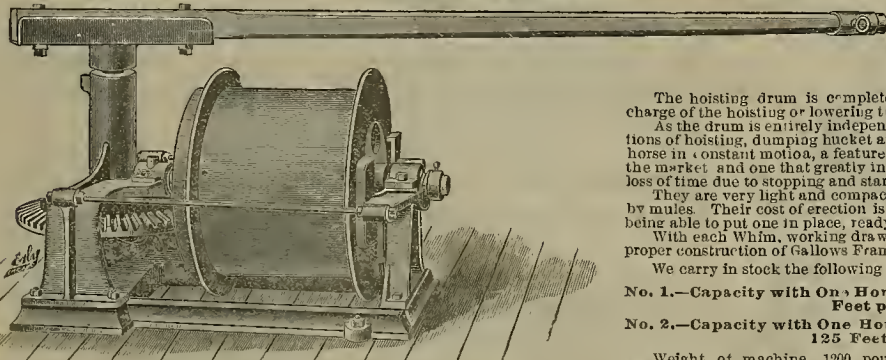
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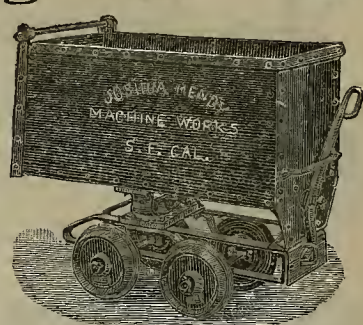
With each Whim, working drawings are furnished showing in detail the proper construction of Gallows Frame and foundation for Hoisting Whim.

We carry in stock the following sizes:

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Weight of machine, 1200 pounds. Total shipping weight, including Sweep, Levers and Sheaves, 1400 pounds.



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An Illustrated Journal of Mining, Popular Science and General News.

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Retorting and Melting.

Cuts on this page illustrate a single retort with melting furnace for bullion in the same setting. Amalgam is placed on trays in the body of the retort, and as quicksilver is vaporized, it passes through the nozzle into the condenser, from which it flows into a receiving tank. Connections are made with the water-jacket of the condenser, so there will be a constant circulation of water while retorting. When all the quicksilver has been driven off

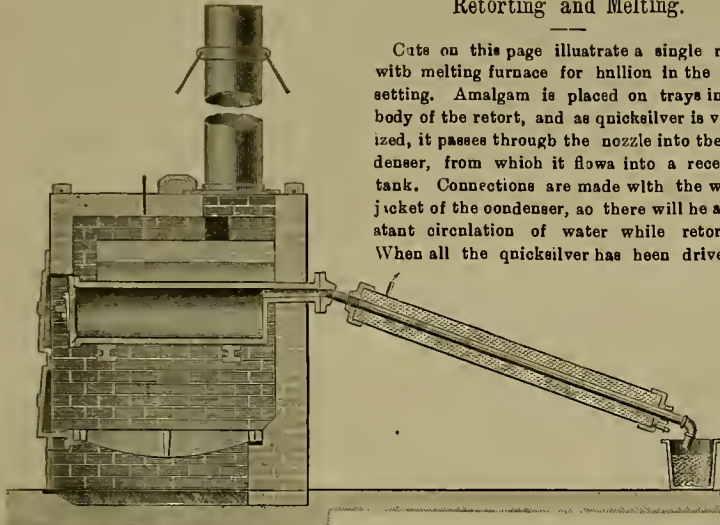
by the heat, the gold and silver will be found in a spongy mass ready for melting. This is done in the melting furnace, the gold and silver from the retort being placed in a crucible, and, after being melted, it is poured into a bullion mold, from which it is taken, cleaned, and made ready for shipment.

When desired, two or more retorts may be placed side by side in the same setting, having flues running to one stack, as shown in other cuts on this page. The melting furnace for bullion is usually built in with the retort set-

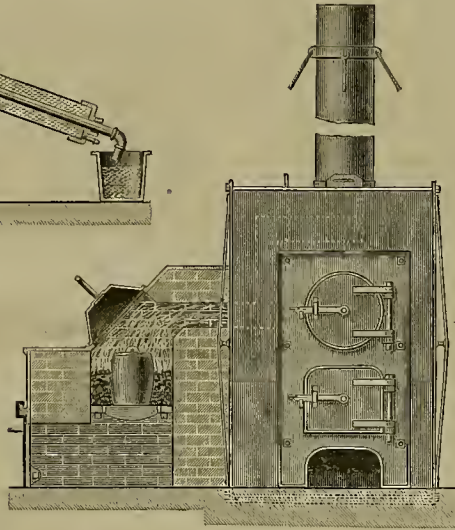
ting both for convenience and to save expense.

Engravings are also presented showing M. P. Boss' improved bullion melting furnace. This improved furnace is operated on the principle of an ordinary forge. The pan constituting the bottom of the furnace should be filled with a mixture of bone-ash and fire-clay, thoroughly tamped down and then scooped out, leaving a lining about two inches thick of the mixture over the entire inner surface of the pan. On top of this and confined by a wrought-iron basket or grate, charcoal and bullion are placed. As the bullion melts, it percolates through the charcoal to the bottom of the pan, and as it accumulates here it is to a certain extent refined by the absorption of the base by the bone-ash lining. The melted bullion is drawn off directly into moulds by tapping the discharge spout

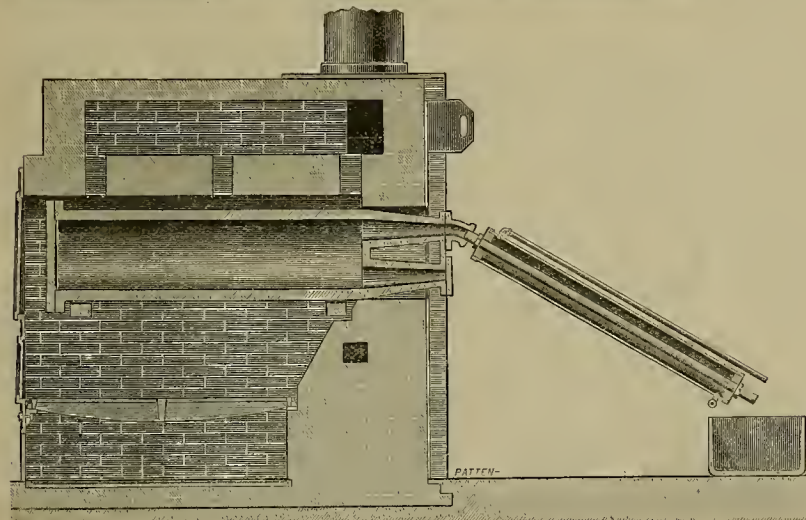
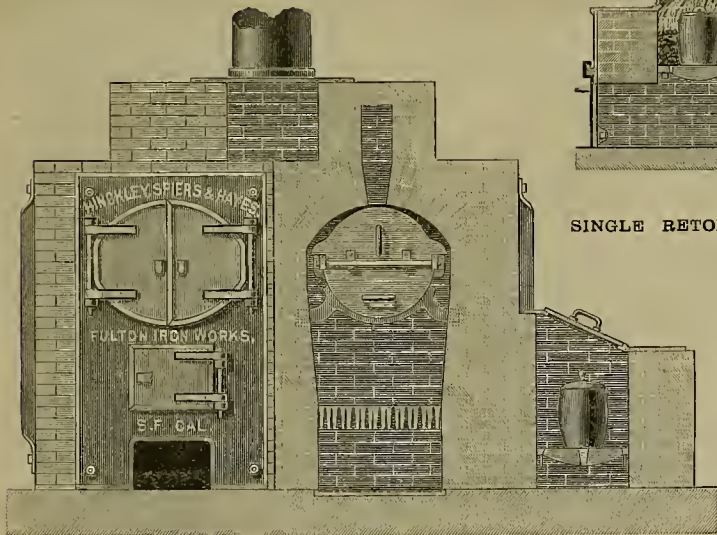
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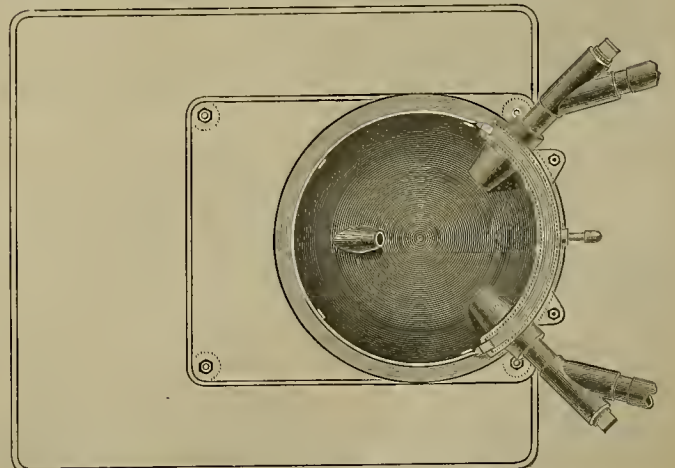
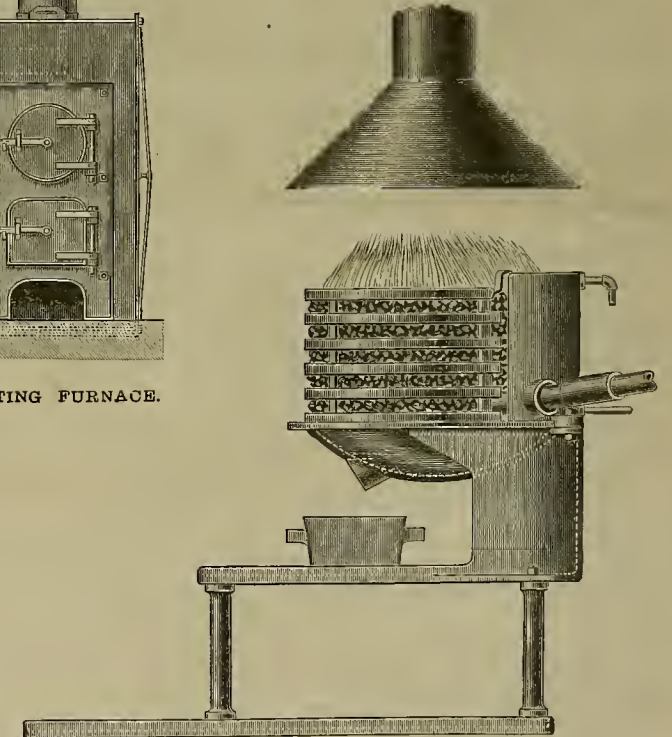
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CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

Mines of Calaveras County.

Sheep Ranch.

[From Our Own Correspondent]

The Sheep Ranch mine is running steadily. This mine is down 1100 feet on a six to seven-foot vein. The property has been worked for many years, and is owned by Mr. J. B. Haggin. Report has it that Mr. Haggin has stated that it paid \$80,000 a year net. Mr. W. Clary is superintendent. While in the engine-room, I was shown a model of an engine with a new valve-motion, the invention of Mr. A. N. Pos, the company's machinist. Mr. Pos is building his model for the Mechanics' Fair, where interested parties will have an opportunity to examine the peculiar mechanism of this independent valve-motion. Mr. Pos is also the inventor of the indicator used at the mine hoist. I have seen no indicator that was as simple or more effective than this. The mine engineer informed me that in the seven years that it had been in use, there had not been a single mistake.

While the Sheep Ranch is the only mine working in the camp, there are a number of other properties in the vicinity that only need capital to bring them to the front. Mr. C. Rodaseni of Mountain Ranch is the owner. The Tom Smith has a tunnel 300 feet long cutting the 2 to 3 foot vein 150 feet deep. One hundred and fifty tons of rock have been crushed; 90 tons at the Sheep Ranch mill, which gave \$14 a ton, and 60 tons at Woods' mill, which yielded \$20 a ton.

The Chas. Anderson has a shaft 80 feet deep on the one-foot vein. This is the same vein as the Sheep Ranch mine. All of the vein matter prospects, and in depth would no doubt swell to the size of the vein in the Sheep Ranch, as the Sheep Ranch vein was not as wide at the same depth.

Mt. Ranch or El Dorado.

Here Mr. Rodaseni has several mines. The Gaston Hill has a shaft down 103 feet, with a drift from the 80-foot level 75 feet long. The vein runs from six inches to four feet; 50 tons milled from the vein, which gave \$15 a ton. The Rose Hill is another of Mr. Rodaseni's properties. This has a 170-foot shaft and a drift 800 feet long on the vein. The drift is run from the hillside to connect with the shaft. The vein crops 20 feet wide. In the bottom of the shaft the vein is 18 feet wide. This ore milled \$4 50 a ton in free gold; rock carries ten per cent of sulphurets, assaying \$69 to \$400 a ton, not saved. Another tunnel of 1000 feet on the vein shows an 18-foot vein; no ore milled from this level, which cuts the vein 460 feet deep, and can be continued on the vein and 120 feet more slope secured. Ore in this drift is heavy with sulphurets—U. S. patents. All of these mines are for sale.

Glencoe.

Mining is very quiet here. The San Pedro is driving a tunnel to crosscut the ledge. The vein is opened to a depth of 250 feet and levels run 225 feet on the 5 to 7 foot vein; 221 tons crushed averaged \$27.83 a ton; vein is called "a seven-foot vein of \$8 rock" by the owner, G. W. Monroe. The Glencoe Con. mines and mills are idle.

West Point.

The Lone Star mine is owned by Wisconsin parties. The mine is on the north fork of the Mokelumne river, three miles northwest of West Point. Mr. Geo. L. Brown, formerly of the Lockwood, is superintendent. The mine has a new 20-stamp mill crushing 2½ tons to stamp; 700 feet pressure requires but 30 inches of water to run breaker, stamps and fine concentrators. There are two parallel veins about 75 feet distant from each other. The veins run from 3 to 16 feet in width, all in granite. The tunnels tap the vein 550 feet deep. The ore is largely sulphurets. Some of it goes as high as \$625 a ton. The mill has run two months. As this is the best plant that has ever been erected in West Point, the people of the town hope for great things from it.

The Tom Paine mine is now the property of Mr. G. A. Billings, formerly of the S. F. Post-office. Mr. Billings has the shaft down 100 feet and a level out 60 feet, showing a four-foot vein; 47 tons milled gave \$35 a ton in free gold, besides the large per cent of sulphurets, which give \$60 to the ton. Mr. Billings is not skeptical in his faith, but is a true believer that the Tom Paine will pan out well.

The Blazing Star. C. J. Moore, superintendent, is now down 275 feet on a vein running from 2½ to 3 feet, which mills \$26 to \$60 a ton from the refuse ore left from sorting, the richer ores being shipped to the Selby Reduction Works, and realizing as high as \$2000 a ton. The mill was burned down this spring but has been rebuilt, and everything is now in running order.

The West Point Chlorination Works are now in charge of Mr. C. Wilson, chlorination and pan process; charges \$20 a ton.

Bonanza Gravel Mines.

This property is on the Amador side of the forks of the Mokelumne river, about five miles north of West Point. The claim is an old river channel 100 feet above the present river-

bed. The storm destroyed almost the entire plant, but a short run has brought the lucky owners out even. The gold is of the same character as that at Forest Hill—cucumber to pumpkin seed in size and appearance. Mr. J. Buhlert of West Point is the owner. It is a difficult thing to say what the future has in store for West Point. The residents are firm in the belief that in depth the mines would all prove valuable. That there is rich ore is not doubted. So far the most of the work has been of a prospecting character—\$5000 to \$20,000 taken out here and there and the vein abandoned. The Lone Star, Blazing Star and San Pedro promise to force up the camp. The Lockwood is working a small force of men in development, but as I could not find the superintendent I cannot say with what success.

West Point has been avoided on account of the want of good hotel accommodations. Heretofore the traveler was compelled to put up with what was offered. Now the Mountain View House and the rooms of Mr. J. Buhlert make a visit to West Point a pleasure instead of an affliction.

E. H. SCHAEFFLE.

May 22, 1890.

The Mesquite Bean.

[Written for the PRESS by C. R. ORCUTT.]

One of the most useful and characteristic of the trees indigenous to the southern-Mexican—borders of the United States is the mesquite tree, also known vernacularly in some localities as the Cashaw, or Algeroia tree.

According to Dr. V. Havard of the United States army, this tree constitutes the principal growth of the wooded tablelands and high valleys throughout South and Southwestern Texas. It extends westward through New Mexico and Arizona to San Diego, California, and is found to the southward through Mexico, Central and South America to the southern parts of the Argentine Republic (exclusive of Patagonia).

Prosopis dulcis (Kunth) is probably the correct botanical name of our tree, though it is usually called *Prosopis juliflora*, D. C., by American botanists. *Algarobia glandulosa*, *Prosopis horrida*, *P. juliflora*, *P. siliquastrum* and *P. glandulosa* are either synonyms or mere varieties, according to Bentham.

The mesquite is frequently nothing but a thorny, straggling shrub, growing in large impenetrable thickets near the coast or over the sandhills of the Colorado desert. Elsewhere, in less exposed situations, it becomes a low, wide-spreading tree, 20 to 30 feet in height, with a trunk seldom over a foot in diameter, although sometimes found from two to three feet in thickness.

In the arid regions, where this tree is found in its best estate, this tree is most useful for the excessively hard, durable wood, valuable for fuel, in fencing or for other uses. Mesquite posts and rails are but slightly affected by exposure to the influences of ordinary weather. The trunk and roots as well as the unbranched sections, from California to Texas, is the most common, often the only obtainable, fuel. The wood is also useful in cabinet work, being heavy, fine-grained, and taking a fine polish, when it has the appearance of mahogany. It is richly covered, varying from purplish-black in the center to a reddish-brown and yellow near the bark.

The tree is also adapted for live fences; of rapid and easy growth in situations where scarcely any other tree will thrive, it can be made to form impenetrable hedges in a few years from the seed.

Baron von Meller says: "The variety *glandulosa* exudes a gum not unlike gum-arabic, and this is obtained so copiously that children could earn two to three dollars a day in gathering it in Texas, latterly about 40,000 lbs. being bought by druggists there."

On the other hand, Dr. V. Havard in speaking of the mesquite tree of Texas, says: "During the summer months the bark secretes an amber-colored gum which has the taste of gum-arabic, and like it makes excellent adhesive mucilage. Its solution in water is slightly acid and astringent; it is a useful and palatable drink in the diarrheas of children. The quantity of gum secreted by each tree is not large enough to make it an important article of commerce."

In California I have never observed the gum in any quantity. I have collected specimens of this gum that closely resembled jet in color and very hard when found—evidently caused to exude by fire.

The tree produces abundantly of its long and slender bean-like pods, with a thick and spongy mesocarp, sweetish to the taste. These pods contain from 25 to 30 per cent of grape-sugar, 11 to 17 per cent of starch, 7 to 11 per cent of protein; of organic acids, pectin and other non-nitrogenous nutritive substances 14 to 24 per cent. They are also comparatively rich in potash, lime and phosphoric acid. The pods of several varieties are said to be rich in tannic acid.

Containing, as they do, more than half their weight in assimilable nutritive principles, these pods constitute a valuable article of food, and are one of the staples with many Mexicans and Indians. The Cahulla Indians, and also the Cocopas of the Colorado desert region in California, gather large quantities of the pods annually, the time of harvest lasting from June into August, when the trees are frequently loaded with their golden wealth.

The squaws go out into the groves and bring back their "hotls" (a large coarse-mesh sack, resembling a hammock) and baskets full of the yellow pods. They then grind the pods in their stone mills, or "matates," into a coarse meal or flour, remove the seeds and hard shells around the seeds, and then cook to suit their taste. Sometimes they boil the flour in water and make a gruel or pudding, but the larger portion of the meal goes to form large, flat cakes or loaves of bread which may be made to supply food for many months to come, and are easy for the nomadic tribes to transport.

This bread is very sweet and pleasant to the taste, with a pleasant, slightly acid and astringent, spicy flavor. A sparkling drink, called *alcija*, is also made from these pods. The Comanche and Apache Indians formerly used large quantities of an alcoholic drink—a weak beer—made by fermentation of the flour.

The mesquite beans (as the pods are commonly called) are relished by most herbivorous animals, and horses and cattle will eat them with avidity and thrive on them as a substitute for grain. They are likely to be more largely utilized as fodder for stock than as human food.

In this connection, it is worthy of note that the pods of the mesquite produced in the valleys near the coast are almost invariably thin and bitter instead of thick, sweet and nutritious, as are those grown in the more arid sections on the Colorado desert and eastward. Evidently a warm, dry climate is necessary to the best development of the fruit, the fogs and coast winds causing a very inferior product. The delicate green, finely divided foliage renders this a very beautiful tree when in leaf, and it is well worthy of being extensively cultivated.

San Diego, Cal.

Hidden Dangers in Dam-Building.

EDITORS PRESS:—In the construction of water-storage dams there is an element of insecurity to be guarded against in some cases, which does not seem to have been publicly noticed. I refer to the swelling of the ground under, or near to, the dam-building.

A valley or wide ravine with a slight descent, and having side-hills coming near to each other at its lower end, is economically favorable for water-imponnding purposes, provided that the collecting surfaces above are large enough to insure the supply required. In the arid regions such a valley is usually so dry that, on the side-hills at least, the general water level can only be reached by deep sinking. If solid primary rock, with little permeability, is available in founding the dam, its bulk, when submerged, will not increase; but if dependences are placed on a stratified formation containing layers of clay, talc or shale, its expansion when exposed to pressured water must certainly be expected. Every old miner has had trouble with swelling or "oreeping" ground, and builders of escarpment walls are aware how hard it is to keep some kinds of rock in place during wet weather.

Assuming that a dam has been built on an unstable foundation of the kind described, what will the effect be when a pressure of 50, 70 or 100 feet of water comes upon it? The whole "country rock" above the dam will, in the center of the ravine especially, both underneath and outside of the dam-building, be saturated to a great depth. Under the abatments on the converging side-hills the pressure will be less, yet every pore and interstice will be filled. Should there be the slightest tendency of this water-charged rock to expand, either laterally or vertically, it is easy to understand how even a dam to itself well planned and carefully built may in time give way owing to such expansion.

The sapping and weakening effects of water percolating under high pressure may go on for years without being noticed, but if the dam erection is ultimately, though it may be imperceptibly, lifted or compressed by the slow swelling of the ravine or hillside formations, so that cracks and veinlets are formed in or beneath it, increased pressure may suddenly destroy it.

The wearing or mechanical effects resulting from a sweating process going on in a dam, or the rock underlying it, is not the only evil which is to be feared. The air acting on wet surfaces promotes chemical changes which are followed by disintegration of the affected rocks, and thus slowly yet surely there may be destructive agencies at work where least expected.

Should there be veins of porous rock dipping under a dam from its upper side, the passage of water through such veins may of itself prove a hidden cause of disaster. The escape may be small at first, but a softening and widening work going on for years cannot fail to weaken a heavy dam-building not very far above it.

If I am right in assuming from reasons stated above that the building of dams on some kinds of stratified rocks renders them unsafe, I trust by calling attention to the subject to encourage investigation and the adoption of adequate engineering remedies. It would be some satisfaction to know whether the Johnstown and Walnut Grove dams were built on stratified rocks. If they were affording evidence long before they collapsed, which they did not give when first in use, that cracks had been opened in them, it is reasonable to assume that they had been injured by the expansion of the foundation and hillside rocks.

JOHN DARE EMERLEY.

The Gold Belt of Northern California.

Ancient River Channels and Gravel Deposits.

NUMBER I.

[Written for the MINING AND SCIENTIFIC PRESS by JAMES F. TALBOTT, Shady Run, Placer Co.]

The original purpose of this paper was to direct the attention of mining men to the unexplored and unprospected mining section of country between the North fork of the American river and Bear river, which in my opinion contains an ancient river channel as rich as any in the county, and from which the gold in the hydraulic mines of Dutch Flat and Gold Run had its source. To give my reasons for this opinion, I have outlined my theory of the gravel deposits and old river channels. The paper was prepared a year ago and left at the State Mining Bureau for publication. Owing to some misunderstanding, its publication has been delayed to the present time, when it is given to the PRESS. I was not aware that Prof. Hanks, or any one else, intended writing on this subject till I saw his first paper in the PRESS.

I lay no claim to scientific attainments or literary embellishments, but have aimed to express my views in a practical form; related facts that are obvious, and accounted for all of the conditions, as appears to me, by the most reasonable and natural methods. With deference to Prof. Hanks' scientific eminence, I protest against his arguing both sides of this question. He is a decade or two behind the age in regard to the miners in this section of country. Some of the authors he refers to as being advocates of the river theory were as visionary as that very limited class of miners who left ounce diggings and rushed to Gold Lake, believing there they would find the fountain-head of the rich deposits below. They possibly had a remote idea of his theory, and believed the lake had been scooped out by a glacier and they would get the coarse gold in its bed.

In point of intelligence the miners of this section of country will compare favorably with any in the State, and it is uncommon at the present time to find one who does not believe in the river theory. They consider it proven and well established from facts made known by developments within the past decade. I have been a firm advocate of the ancient river theory for the past 30 years; have been a close observer of all the conditions and deposits in the deep gravel beds and drift mines. I have stood in the uncovered channel of a hydraulic mine (and handled the pipe) and have swung a pick at the breast of a drift mine in California, and I have not seen or read anything that would cause me to doubt the correctness of it. I have seen nothing in all of my experience and observation within the gold belt, from the Calaveras river to the South Yuba, but what can be satisfactorily accounted for by the action of water and extensive landslides.

Prof. Hanks has failed to show wherein his theory possesses any practical advantage over the river theory in regard to the discovery of new mines, or working those already developed.

That those gravel deposits, channels or basins are here as a fact no theorist will deny; and I think more valuable results will be obtained from a correct knowledge of just how they are, and an examination and study of the conditions and indications that denote their existence in unexplored localities, than any theory about how they came there, however scientific and interesting.

The MINING AND SCIENTIFIC PRESS is the only paper we look to now to bring our section of country into notice among mining men, and through your instrumentality, in the near future, this region will have as great a notoriety for its drift mines as it had last winter for snow during the blockade.

With this brief explanation, I will go on with my paper as originally written, considering, in due course, the hydraulic mines of Dutch Flat and Gold Run, and the prospects of mining in an extensive unexplored and unprospected section of country.

There has been so much written about the "Citrus Belt of Northern California" that, for a change, I propose to write a chapter on the "Gold Belt of Northern California."

This gold belt is on an average about 20 miles wide, extending from south to north, running through the counties of El Dorado, Placer, Nevada and Sierra, in Townships Ranges 10, 11 and 12 east, Mt. Diablo meridian. In some places it extends beyond the lines here indicated, on either side. In no portion of the world has as

Rich Gold Mines

Ever been discovered and worked, in as healthy a climate, with easy access and every facility at hand for working them. In the early days of mining, the richest ravine, canyon and river diggings were found within the limits of this gold belt. From numerous localities, from Hangtown to Downville, on this belt, gold-dust was packed out by the mule-load.

From the character of the diggings and the thousands of miners working them, it was apparent that a few years would exhaust this class of mines. In 1851-52 the miners began to realize the fact and feel the effects of the waning rich diggings.

The accidental discovery of gold on Georgia

Hill, at Yankee Jim's, in the summer of 1851, marked

The Commencement of a New Era

In mining, and started a mining boom as big as the days of '49.

On a point high above Devil's Canyon, on the south side, near the trail leading from Yankee Jim's to Todd's Valley, a large tree was upturned by the roots, and exposed to view some fine gravel and decomposed boulders. A company of experienced Georgia miners were at work in Devil's Canyon and had got big pay in the canyon, just below this gravel point on the hill. They prospected some dirt from about the roots of this tree, got a good prospect, located and worked the first hill diggings in Placer county. No claim of the kind and same extent in the State has produced more gold than this one on Georgia Hill.

When this company worked out their claim and left for the States, they loaded several mules with gold-dust, the proceeds of their work in Devil's Canyon and on Georgia Hill. This discovery excited universal astonishment among the miners; heretofore the richest deposits were looked for in the deep gorges of the canyons and gulches.

Up to this time no particular theory had been advanced in regard to the source of the gold and method of deposit.

The great mystery and all-absorbing topic of the day was to find out how the gold got from Devil's Canyon up on Georgia Hill. Some of the pioneer philosophers of the pick are always equal to any emergency, and they solved the problem in this instance to their own entire satisfaction. They pointed to the admitted fact that the same kind of gold was found on Georgia Hill that was in Devil's Canyon, and that there was but one way by which it could possibly get from the canyon up on the hill, and that was it was "hove up." This "hove-up theory" prevailed for a short time. Every gravel deposit found on the hills had been "hove up there," according to their ideas.

The army of prospectors for hill diggings soon developed the fact that

An Extensive Gravel Range

Extended northward along the western border of the gold belt. Rich strikes were made all along the line south and north. This gave rise to a new theory, the "cross channel." This class of theorists claim that the ancient river channels run across the country on a line with the extensive gravel deposits, and that the modern rivers cut them at right angles. A scientific writer of the times, following in the footsteps of the practical miner as strikes and developments are made northward, thus expresses the ideas of this theory. Of Placer county he says: "It is traversed from south to north by one of the most extensive auriferous gravel leads in California. Commencing in the south at Todd's valley and extending northward through Yankee Jim's, Wisconsin Hill, Iowa Hill, Indiana Hill and Gold Run, from Gold Run the channel bears northeast to Dutch Flat; here it makes a short horse-shoe curve and turns directly to the westward and enters Nevada county at Little York." There is a wide difference of opinion among the advocates of this theory. One portion claim that the grade of the channels was originally from south to north, while in places where the bedrock has been reached and worked to, the present grades show this to be impossible. They tell us the bedrock has been "hove up." The other portion contend that the channels ran from north to south. Both parties arguing from the same premises, point to the admitted fact that certain gravel deposits, channels, and the gold in them, are identical in Sierra, Nevada, Placer and El Dorado counties. A direct, imaginary connection is made between points 50 or 100 miles apart, over high, barren, bedrock ridges and deep canyons, where for miles there is not a vestige of gravel or a color of gold. This theory is but little better sustained by existing facts than the "hove-up" theory, although there are many good practical miners who still adhere to it.

This is an outline of the principal theories that prevailed in this section of country until the winter of 1852-53, when a company of miners working near the head of Jenny Lind canyon, south of Forest Hill, had their claim and tools covered up by a big slide from the hill caused by the heavy storms of that winter. After the storms let up, this company commenced washing off the slide to clear their claim of the debris and recover their tools, when, to their great surprise, they found this slide had uncovered a very rich lead of coarse gold and revealed its source. This accidental discovery turned the progressive miners' ideas into the right channel and added many millions to the stock of gold.

Tunnels Were Run in

Through the rimrock for miles above and below Forest Hill and all of them that were low enough struck rich gravel and established the fact that an extensive rich channel was buried deep beneath the lava-capped ridge. These developments originated what I shall term the progressive theory, which will now be considered. It is apparent that some great revolution of Nature has completely changed the condition of things from what they were at some remote period of time, and those extensive lava ridges point directly to the prime cause that produced this great change:

(To be Continued)

Entries on Arid Lands.

There seems to be an effort in progress to get Congress to amend the existing law which prevents the issue of patents for arid lands in view of the proposed action of the Government in building reservoirs or at least in reserving sites for them. The claim is made that

"Not an acre of such land in the great West entered since October 2, 1888, can be patented and such entries, without useless relief, will be canceled. Tens of thousands of acres on existing irrigating canals, actually being cultivated and reclaimed by water from such canals, cannot now be patented because entered since October 2, 1888."

Thousands of bona fide settlers in California, Arizona, New Mexico, Utah, Colorado, Washington, Nevada, and throughout the entire surrounding region have been allowed to enter Government land, are complying with the law as they suppose it to be, and as it has existed, are getting water from constructed irrigating canals, are honest, hard-working settlers, but who would to-day be denied a patent for that same land and are unconscious of the fact.

If the facts are as stated, the hardship is certainly great and the relief measure should receive general attention. How the deplored condition came about is explained in this way:

"It is stated that in drafting the Act of Oct. 2, 1888, which reserves from entry, settlement or occupation certain public lands, the conference committee did not intend to prevent and prohibit the entry and reclamation of lands adjacent to constructed irrigating canals or those in process of construction, but that they did overlook the fact that the broad wording of the Act would have a wide-reaching and disastrous effect not intended or desired by its projectors."

We give these statements as we draw them from a circular which we receive from Chicago, without our indorsement, because we are not at the moment informed upon the truth or bearing of the statements. They commend themselves to the attention and investigation of those who have patents pending on entries made since 1888. We know there are hosts of such entries, and many of them have been made not by actual settlers but by speculators, and we are not sure that the movement we allude to is not nine points for the speculator to one for the hard-working settler, who does not even know what a box he is in. For this reason we counsel inquiry and contributions to our columns from those who are possessed of the facts in the case. The remedy which is proposed is two-fold. One is to repeal Act of Oct. 2, 1888, so far as it might be construed to affect land which can be reclaimed from existing irrigating canals with vested rights, allowing every person who has made entry of lands lying so adjacent to such canals since the passage of said Act to perfect the title to the same. Another remedy is to insert in the objectionable law the following amendment:

"And every person who has made entry under homestead, pre-emption or desert-land laws, of any desert or arid lands lying so adjacent to any constructed canal that the water therefrom may be used for irrigating said land, shall be protected in his said entry, and allowed to perfect the same, subject to the exceptions in this section."

On the face of the matter, it appears merely to give title to lands to those who really merit it, but we have seen so much legislation which accomplished results not held in view by the framers that we apprehend evil from any measure to unsettle the present status of the arid lands likely to be improved by the Government work.

THE CARLISLE MILL.—The person in charge of the Carlisle mill, at Carlisle, has been ordered to take the machinery on a ship to San Francisco, and sell it for whatever it will bring, excepting the 20 stamps leased to John A. Miller. As to this lease, the company has retained counsel with a view of having it set aside and canceled. Geo. W. Eustice, manager and superintendent at the time, executed a lease in behalf of the company to Mr. Miller to 20 stamps, and agreed to put everything in good order for the running of that many stamps. The company desires to avoid this lease, and a hard-fought lawsuit is liable to be the result. It is such conduct as this on the part of alien corporations that brought into existence and prevents the repeal of the alien law. After this company had enjoyed dividends in England from the products of this mine, it should have shown enough liberality when it abandoned the property to let someone take the mill on fair terms, instead of trying to barter the machinery off as old iron. The conduct of the company indicates that if it cannot make money, no one else shall get the benefit of its cast-off property. Hardly gratitude, that. *Southwest (N. M.) Sentinel.*

THE DYES FROM COAL.—No less than 51 distinct substances are found in coal, all of which, though not equal in importance, are largely utilized. In the manufacture of coke, coal tar is a resultant product. The coal tar, upon redistillation, yields, among other things, a large amount of volatile oil called benzole. Hofmann found that benzole, upon proper treatment with certain chemicals, yielded aniline, an oily liquid akin in its nature to the alkaloids, nicotine from tobacco, and conine from hemlock. Hofmann also succeeded in

getting a beautiful dye from aniline by oxidation. This dye is called rosaniline, and from it may be obtained every conceivable shade of color. It is a curious fact that this intense dye is colorless in an absolutely pure state, but on uniting with acids it at once takes on its characteristic vivid crimson color. Since the most important part in the manufacture of these dyes depends upon the oxidation of the aniline, it is necessary to get some common and inexpensive substance for that purpose. Unfortunately for the personal comfort of many people, arsenic acid, one of the most fatal poisons, is the substance generally used. It is due to this chemical that so many of the fabrics dyed with aniline colors are injurious. The dyes in themselves are harmless. The arsenic acid is not essential to the color, but after it has done its duty as an oxidizer, the manufacturer does not take the trouble to remove the poison carefully from the dyes. The suggestion to use other oxidizers that are harmless has often been made, but arsenic acid is in such general use that manufacturers are unwilling to give it up. The only possible check upon its use is stringent legislation.

Cerro Gordo District.

H. M. Yerrington, Sam Jones, Lon Hamilton, Evan Williams, John Ludwig, Colonel W. J. Sutherland of the Candelaria Company, and Captain Hulse of England, who is also largely interested in Candelaria, have made an extensive examination of the mines of Cerro Gordo District, Inyo Co., Cal., and saw developments and promising prospects enough to much more than justify the glowing accounts that have been received from that section. The celebrated Union mine was thoroughly inspected, and its prosperous condition was sufficient to satisfy the experts as to the immense wealth of the district. The appearance of this mine and of other valuable mineral properties aroused so much interest that Messrs. Jones, Ludwig and Hamilton remained a day longer for further examination, while the other members of the party took a hurried glance at the various other important industries of that section. It is pretty well understood that Cerro Gordo is on the eve of a return of prosperity that will cast in the shade the recollections of former days of opulence.

The conditions attending the development of the rich ore bodies of the district have been so changed for the better by the facilities for transportation and reduction afforded by the railroad, that the renewal of activity that has arrived at such a stage as to attract widespread attention is but the legitimate result of confidence in the ability of operators to make a permanently profitable business of handling the ore of the camp—not as formerly, obliged to cast aside any but rock of very high value, the owners are now able to treat successfully the entire yield of the mines, and enforced search for rich pockets will no more cause periods of unremunerative mining.

However, although Cerro Gordo district is the present center of attention, owing to its magnificent promise of large and speedy returns, it is not by any means the only field of important enterprise in Inyo county.

The party with Mr. Yerrington, after leaving the mining district, visited the great soda works at Independence lake, and also the Inyo marble works, where the quantity and quality of the marble surprised those of the visitors who had not previously seen the quarries. It is from these works that the marble used in improvements on the Palace hotel is being shipped.

On Sunday the party reached Candelaria on the return trip, and were there hospitably entertained by Colonel Sutherland and Captain Hulse. Candelaria has again become one of the rushing camps. The energy of Col. Sutherland's management has put the mines in good condition for working, and the excellent prospects have renewed the hurry and bustle of other times. No time has been wasted in the work of preparation; work has been pushed with vigor, and the mill in town will begin crushing ore on the 20th of this month.

The great chain of rich mineral districts extending from Candelaria south is scarcely as yet well understood by the mining world. The extent of territory, value and quantity of ore cannot be realized without a visit of inspection. The abundance of all classes of mineral from free gold to heavy lead ore assures for the country a brilliant future.—*Virginia Enterprise.*

TECHNICAL SOCIETY.—The Technical Society of the Pacific Coast held its regular monthly meeting last week. There was a good attendance, and Professor Frank Soole presided in the absence of President J. Richards. The feature of the evening was a paper read by Professor Irving Stringham on "Napier's Definition of Logarithm and its Consequences." He said Napier's definition was by means of the relative motion of two points in a straight line: the one moving with a constant velocity, the other with a velocity proportional to its distance from a fixed origin. He said this definition led directly to the fundamental principles of the differential calculus, and one of the principal objects of the paper was to show how this connection was made. It appeared from the paper, as read, that Napier was on the threshold of the discovery of the differential calculus more than half a century before the publication of its discovery by Newton.

Big Tree for the World's Fair.

Neal Girard Van Doornom of Cramers, Tulare county, is making preparations to take out a section of a big redwood tree for the purpose of exhibition at the World's Fair in 1893.

This will be the largest section of any big tree ever taken from California. The tree measures 99 feet in circumference, making it 33 feet in diameter. The section to be taken out will be nine feet in height and 60 feet in circumference. It will be divided into three cuts.

The first cut will be one foot in height by 20 feet in diameter. This cut will be split once across, making two half rounds. The next cut will be seven feet in height by 20 feet in diameter, and will be hollowed out, leaving the bark and sap and about four inches of the timber. The last cut will be the same as the first, allowing all the timber to remain and only splitting once. All three cuts will be set up together when on exhibition.

The manner in which this tree will be gotten out will convince the most skeptical of people that this is not misrepresented, but the largest section of any big tree ever taken from California. The World's Fair Big Tree is to be taken from Mammoth Forest, Tulare county, California, which is located 52 miles east of Tulare City, at an altitude of 6325 feet above the level of the sea.

The work of felling the tree has already begun. Ten skilled workmen have been engaged and are busy at work. The saw to be used in getting out these sections is 22 feet in length, and was made to order by the Pacific Saw Company of San Francisco. It is said to be the largest crosscut saw ever made of one piece of steel, and is supposed to require eight men to handle it. It will take ten men at least two months to complete all the work to be done. Considerable time will be required for the timber to dry, as the weight of green redwood is very considerable.

Everything will be in readiness long before the proper time arrives for shipment.

Three flat cars will be necessary for transportation, as the total weight will not be less than 65,000 pounds.

Chinese Miners on Public Land.

The Idaho County *Free Press* says: Since Judge Sweet's decision in the Moose Creek case that Chinese have no right on public land and that the leasing of mining ground to Chinese is equivalent to abandonment of the same, quite a number of people with more or less good intentions—and not a few in the hope of getting something for nothing—have started out to give the Chinese a literal interpretation of the judge's decision by evicting them from sundry claims on Salmon river, Pierce City and elsewhere. The mere fact that a claim has been worked for a number of years is regarded by some enthusiasts as *prima facie* evidence that the ground is very rich. We apprehend that there will be more blasted hopes than gold-dust realized out of the bunk of these claims, and that their owners will be as eager to relinquish as they were to acquire possession of their "mines." With the exception of the Moose Creek, Buffalo Hill and Campbell claims in Elk City, and possibly a couple of the Meadow claims in Warrens, there is no ground of any consequence in Idaho county now worked by Chinese.

The time has gone by when this decision can affect the status of the Chinese placer miners in Idaho county. It was announced 20 years too late. The Chinese have skimmed the cream of our camps over and over again, until the Chinese question has solved itself. When we first knew Warrens, ten years ago, it was a busy hive of Chinese industry. To-day, owing to the exhaustion of the ground, the Celestial population has dwindled away until now they scarcely equal the white men in numbers. Elk City and Pierce City have undergone similar experiences, and the last two summers witnessed a very large exodus of Chinese from this county. May their stay be long.

THE MOUNTAIN LEDGE.—The Mountain Ledge Gold Mining Co. (Limited) of London has recommenced operations on its newly-acquired mining property near Sierra City. Contracts have been let for a 40-stamp mill, tramway and other essentials for a complete plant. This event will stimulate other enterprises, and as this corporation ranks foremost among the English mining companies, there will be no lack of capital to develop the property, which is said to be very valuable, and will consequently prove of great advantage to Sierra county.

SAVING FUEL.—In view of the numerous claims of inventors for saving fuel, a well-known locomotive engineer declares that if he could invent a red patent that would withstand the action of the fire, he would have no difficulty in getting certificates of a saving of 25 per cent in fuel.

GOLD AND SILVER.—The U. S. Sub-Treasury in this city has now in its vaults \$68,073,411.78 in gold and hard cash. Over \$42,000,000 of this is in gold coin and over \$25,000,000 in silver coin. The shipments of silver from the Sub-Treasury during the past month amounted to \$53,705.

MINING SUMMARY.

The following is mostly condensed from journals published to the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

BIG CLEANUP.—*Ledger*, June 7: The last cleanup of the South Spring Hill mill, made early in May, was the largest ever made in the history of this famous mine. The yield amounted to \$66,000, including the sulphurets for the month. While the yield would have been a heavy one under any circumstances, still the fact that a thorough cleanup of the plates was made at that time helped materially to swell the figures to the above handsome proportions. The plates had not been so thoroughly cleaned before for several years.

NEW LONDON.—The 40-stamp mill is kept plodding along steadily, eating up about 100 tons per day. It only requires about four hours per day to hoist and deliver to the mill all the ore required for the 24 hours. The Frue concentrators are working well. The mine is unquestionably on a solid paying basis, although the ore is not high grade. About 80 men are employed in mine and mill. The superintendent, H. Reese, to whose judgment and management the development of this splendid property is mainly due, has everything about mill and mine in excellent shape and running with clockwork regularity. Owing to the strong pitch of the ledge south, most of the ore which now supplies the mill has to be run 600 feet to the shaft. To avoid this travel, it is probable that a new shaft will be sunk in the near future some distance south of the mill.

PLYMOUTH CONSOLIDATED.—Twenty stamps of the Pacific mill are kept running. The new ore body struck in the Indiana ground is five feet wide and estimated to mill at least from \$10 to \$12 per ton. The discovery holds out every promise of insuring another long career of prosperity for this famous mine. The development is at a considerable distance south of the Pacific shaft, necessitating running the ore 600 or 700 feet underground. To obviate this difficulty it is probable that a new shaft will be sunk. Messrs. Hayward & Hobart were expected in Plymouth early this week to determine this matter.

AMADOR GOLD MINE.—The mill was started Monday afternoon. As anticipated, considerable trouble was encountered in getting the car-track in order. This track is about half a mile long with a grade of a couple of hundred feet. The loaded down-car is intended to pull the empty car back. As the grade is not uniform, and there are one or more curves to be made, it was soon found that more rollers for the cable to run on would be necessary. These have been sent for, and other defects will be remedied as fast as discovered. It is the general opinion that with a few changes the track can be made to work as intended. J. O'Neil has charge of the mill, with Jas. Mushett running the concentrators.

GOVER.—This mine has never been in such a flourishing condition as at the present time. At the mine they are putting in self-dumping skips, which will be a great advantage in the handling of the ore. At the 500-foot level there is a 25-foot ledge from which the mill is kept running. They are prospecting at the 600 level north and south. In the west crosscut there is a four-foot ledge which is increasing in size as it is driven forward. There is every indication that this mine will run for a good many years to come. Mr. Call has given his greatest attention to this property, and is working the mine to the best advantage. Improvements have also been made at the mill. Four new Woodbury concentrators have been put in, as the other machine did not catch the fine sulphurets, which are very rich in the Gover rock. The machines are run by a separate water-wheel, which is put 12 feet above the machines so that the water that runs the wheel will also supply the concentrators. New mortar blocks have also been put in. A new clean-up room has been erected, adjoining the mill. A coat of paint inside and out gives it a neat appearance. The mill is in good working order and is one of the mills that decorate the mother lode of Amador county.

Calaveras.

FINE ROCK.—*Calaveras Chronicle*, June 7: Some fine rock has been struck in the Occident tunnel of the Sandy Bar M. Co., on the Mokelumne river, this week. The rock is heavily charged with galena sulphurets and carries a liberal quantity of free gold. The ore is good for \$60 a ton. This rock was encountered 200 feet below the surface. The surface ore resembles in every particular the ore 200 feet below, except that it is not so rich, thus leading to the presumption that good rock extends all the way down. The ledge is $\frac{3}{4}$ feet in width, but the rock is not, of course, of the same grade throughout. It is estimated that the whole vein will average a yield of \$10 or \$12 to the ton. A force of carpenters is at work upon the mill pushing it as fast as possible to completion. There is a large supply of rock on hand ready to be put through the mill. The mine bin, with a capacity of about 800 tons, is full, awaiting the completion of the mill-bin to be relieved of its contents.

MORE STAMPS.—*Mt. Echo*, June 5: The Tuloc & Lane management will erect at once an addition of five stamps to the original battery, making ten stamps in all.

Inyo.

SYLVANIA.—*Cor. Index*, June 7: J. C. Crocker, just in from Sylvania mining district, reports everything progressing finely. The foundations for the engine and smelter are completed and the furnace is being put up. Lumber for building the balance of mill arrived Monday and will be shipped out immediately. About 40 men are working at present. Coal pits are up and ready to burn on completion of furnace. Everything in and around the Co.'s works is progressing as well as could be expected under all circumstances, Sylvania being 48 miles from Alford on the C. & C. R. R. We were shown some of the ore to-day and pronounce it the best smelting ore we have seen for several years. It is high up in silver and carries from 35 to 85 per cent lead. It is Ho! for Sylvania now, or bust! The travel to and from there is increasing daily. We hope soon to see the first output of base bullion arrive at Alford for shipment. The company has hoisting machinery on the road which will be erected as soon as possible and

the shaft sunk another 100 feet. They are running tunnels and opening up the mine so as to have plenty of ventilation and mine in good shape for work.

Mariposa.

THE HART.—*Gazette*, June 7: For the past two weeks work has been nominally at a standstill as far as the actual developments of the Hart mine are concerned. The preparations that have been made, however, will allow of much more quickly and extensively carrying out the necessary opening of the mine. It has been demonstrated that the ledge is of an average width of two feet, having gradually widened from the surface where it was but six inches to the present level, 80 feet. The former force of three men has been increased to six, and the quarters for the men have been removed to a convenient point near the works, enlarged and made more of a permanent character than those heretofore occupied. The new whim was completed this week, and work is now being pushed with a vigor, worthy of the ample reward the present prospects surely indicate must result.

Nevada.

A SLIGHT HITCH.—*Grass Valley Tidings*, June 3: The Brunswick machinery is ready to start up and will be in operation in a few days, when differences relative to the contract for water with the Grass Valley Water Co. are adjusted. One day last week a $\frac{1}{2}$ -foot ledge was cut in the second level of the Brunswick. The ledge shows free gold and has a "lively" appearance generally. It has never before been worked. Supt. Fitzgerald regards the find as full of promise and is anxious to sink on it.

Placer.

LOST CAMP.—*Truckee Republican*, June 4: A discovery of gravel placers, rich in gold nuggets weighing from half an ounce to six ounces, is reported in the vicinity of Lost Camp, between Blue Canyon and Emigrant Gap. Rich placer ground was discovered in Lost Camp in 1854, but the prospectors, forced to leave their location to visit Sacramento for the purpose of obtaining supplies, on their return failed to find the locality, hence it was christened Lost Camp. At the date of its first discovery Lost Camp was in a dense forest without wagon-roads, or even trails, leading to it. After the construction of the Central Pacific railroad the ground in the vicinity was divested of timber to furnish fuel and lumber for building purposes, and the auriferous character of the ground led to prospecting, which resulted in the rediscovery of the lost placers.

FOREST HILL.—*Placer Herald*, June 7: At the Mayflower the tunnel has been run 1200 feet in a northerly direction under the old works, and Supt. Beech expects to start the mill in six weeks. Swansborough & Co. have leased the Dardanelles and are taking out good pay dirt. The Breece & Wheeler mine is paying big. The yield for the last month netted the owners \$10,000. Work at the Hogshack is progressing satisfactorily. The tunnel is now 1500 feet in length. The tunnel at the Gray Eagle is in about 1500 feet. The rock is soft and easily worked. Henderson & Pease expect to make a good cleanup in their claim at Yankee Jims, as the gravel prospects well. A. Clark has the iron ore band for some 600 feet of car track at the Wolverine tunnel. Tom Harper is rubbing his tunnel at Sailor canyon, having run about 700 feet this winter.

San Diego.

SHAFT.—*Julian Sentinel*, June 6: The contract for sinking the shaft on the Kentuck S. mine was awarded to L. N. Bailey. Work at the Owens mine is progressing rapidly and operations will be commenced in another week.

Shaeta.

LOWER SPRINGS.—*Cor. Democrat*, June 6: The Ottawa reduction works are almost ready to resume work again. They have changed crushers and now have a Dodge pulverizer. They have, or will have, 100 tons of ore from the Becker mine, located on the Igo road. It is not their best ore but will be a general sample. Sheriff Hopping and Cowen, owners of the Chalk Hill mine, located about seven miles southwest of Redding, have bought 160 acres of land from the railroad company and on this land is some very good placer ground, but the most attractive feature of this property is the Hopping & Cowen quartz ledge. They have taken out about seven tons of ore that ought to mill \$100 per ton free milling, and still more in sight. Near Ladpole, below Centerville, they have three large ledges, all of which prospect very well. One of the three is called the Legal Tender mine, which has \$15-ore in sight. The Pearl mine, in Lower Springs mining district, is having assessment work done for 1890. Some of the ore runs 10 per cent in sulphurets, and assays over \$300 per ton. The ledge will average one foot wide.

REDUCTION WORKS.—*Redding Free Press*, June 7: The reduction works below town are ready for business. The gold is separated from the quartz dust by specific gravity and a system of air currents. Wm. P. Miller of Lower Springs is having a couple of tons worked by way of test. Should this process of reducing ores prove a success, there will be plenty of business for the projectors of the enterprise, and these works will be followed by a smelting plant.

A THIRD TUNNEL.—Mr. Hart of the Texas and Georgia mine says that the mine at Old Diggings is looking splendid. He is driving his third tunnel into a mountain of ore, which is very rich at a distance of 640 feet from the surface.

CASTLE CRAG.—Hufface is down from Castle Crag and says that country is alive with prospectors and that many locations have been made all over the Castle Creek district.

Sierra.

A FAILURE.—*Mountain Messenger*, June 7: The Red Cliff quartz mine, on Kanaka Creek, Sierra county, on which Prof. Barnhardt, from Cleveland, Ohio, with a flourish of trumpets, built a big mill last year, with Eastern capital, without first taking the precaution to ascertain if he had enough pay ore to make a mine, has been attacked by Albert Hotchkiss, who has a judgment against the property for \$638.50.

Siskiyou.

GRAVEL AND QUARTZ.—*Yreka Journal*, June 11: The Black Jack Mining Co., at Cottonwood intend having their hard gravel crushed in Coyle & Jacobs mill, as an easier method than endeavoring to dissolve it in sluices. River miners on the Klamath are busily engaged in getting ready for hoisting

ore. On the 650 level the exploring drifts have reached quartz that is beginning to carry metal.

CON. CALIFORNIA & VIRGINIA.—The 1300 and 1500 levels continue to yield the usual quantity of ore. On the 1435 level, west crosscut No. 3, from the main south drift, 110 feet south of west crosscut No. 1, is advanced 302 feet, continuing in porphyry and quartz showing value. Are still obtaining good ore at several points on the 1650 level. The usual amount will this week be shipped to mills on the Carson river and the average of battery assays will be about the same as last week.

SCORPION.—The southwest drift on the 630 level still continues in a favorable formation composed of a mixture of porphyry and clay.

Eureka District.

ORE SHIPMENTS.—*Sentinel*, June 7: During the present week the E. & P. railroad shipped 370 tons of ore to Salt Lake City. This amount is not up to the general average of shipments per week. The falling off is due to the Diamond Co. using the teams in hauling their new machinery and lumber, in place of hauling ore from the mine.

Hicks District.

AN EXAMINATION.—*Elko Free Press*, June 7: We understand that a mining expert of high scientific attainments, from the East, visited this (Hicks) district some 8 or 10 days ago with a view of examining the Woonooke mine and its extension, and reporting thereon to a party of prominent St. Louis capitalists. After examining the mines and their surroundings he was much pleased with the size and character of the ore bodies exposed to view, as well as the richness of the same, and when informed of the number of mining districts that lie in this mineral zone unexplored he was perfectly amazed at the vast metallic wealth that seemed to be in this remarkable region. The price fixed for the property examined is only \$100,000, and there is no doubt but what the sale will be consummated. The Hicks mining district is situated northeast from Mountain City some 13 miles, and from Elko about 75 miles due north. The mineral surface indications are very conspicuous and naturally attract the attention of geologists and mining experts. This mineral field is about 8 miles long and 5 wide. The formation is slate limestone with dykes of granite here and there. The ores are smelting, galena and carbonate in character with considerable desulphurized iron. The principal mines are situated on one of the main spurs of Hicks Mountain, known as Capital Hill. The principal ledges are the McDonald and Woonooke, owned by McDonald, and the First North Extension, which is owned by Messrs. Sproule & Mayhugh. To the south, on the same vein, is located the Constitution and the First South Extension; also the Globe, with several other locations of importance. The McDonald mine has been thoroughly explored and developed, and exposes to view several thousand tons of ore that will average from \$65 to \$70 per ton. The Woonooke is also well developed by a number of shafts and stopes which show a ledge 25 feet wide, giving an average assay of \$75 to \$80 per ton. The First North Extension has not been opened out yet to any extent, but all indications give promise of great value. Hicks Mountain is covered with an immense growth of large timber, suitable for mining, milling and domestic purposes. Just below the mine, in the canyon (which has an easy descent) some 800 or 900 feet, flows one of Nevada's most beautiful streams of pure water, gurgling the entire year from the base of this great mountain, whose altitude is not less than 12,000 feet above the level of the sea.

Jackrabbit District.

PROMISING OUTLOOK.—*Pioche Record*, June 2: Tuesday we paid a visit to Jackrabbit, and while there examined the Day mine and Onondaga, both the property of the Pioche Consolidated and Yuba Mining Co.'s.

THE DAY MINE was purchased by the present owners some three months ago, and is, under the ownership of Mr. T. C. Williams, proving a valuable piece of property. They are at present working a force of about 35 men and expect soon to increase. The mine is 900 feet deep, but work at present extends to 400 feet only. A drift of 800 feet leads one to where the engine is; a drop of 400 feet and you are on the 4th station where there is a body of ore in sight that is 100 feet wide and 7 feet thick and opened for about 200 feet. The amount of ore on this level is hard to compute, but it is safe to say that 100 tons a day can be shipped for two years at least. The advent of the railroad next fall will see trains loaded with Day ore leaving the depot regularly. The average of this ore is about 40 oz. silver and 20 per cent lead. On the engine level and where the strike was made which partly induced the purchase of the mine, a stope has been run for a distance of 200 feet, the ore averaging for the whole distance three feet in width, and will assay 50 to 80 oz. and 25 per cent lead. On the top workings of the mine there is a fine body of two feet of ore exposed that goes 200 oz. silver and with a little assorting will go 40 oz. per ton. The mine as it now stands with work only being done on the above-mentioned places shows more ore in sight and of a larger body than any mine on the coast, possibly outside of the Comstock. The same body of ore shows itself on the 6th level, but has not been opened up yet.

THE ONONDAGA MINE, which has recently been purchased from Messrs. Turner, Welland and Williams for the sum of \$36,000, is another fine piece of property. The ore of this mine is easily worked and of a more than average grade. There are at present five men taking out ore, and it is understood that it will not be long before more men will be put on.

Jersey District.

SHIPMENT OF LEAD ORE.—*Reese River Reveille*, June 4: John Able hauled to the N. C. track, this side of Bridges' station, yesterday, 40 sacks of lead ore, taken from Blossom's mine in the Jersey district. He, S. W. Sturgeon and George Able have leased it, and propose taking out a carload and having it sampled at Ledlie. We learn that it carries a large per cent of lead, and that the Ledlie sampling works will take every ton of it, as it is very valuable to mix with smelting ores. The boys speak very favorably of their prospect and propose to get out everything that there is in it.

Jungo District.

PROSPECTING.—*Silver State*, June 5: C. S. Wright and Charley Harvey are prospecting a mine which they own in Jungo district, 40 miles west of

Winnemucca. They have sunk a shaft twelve feet deep and have a lead about ten feet wide. The ore carries considerable galena and carbonate of lead combined with silver and gold. They have brought in 16 sacks of ore which they will ship to the Selby smelting works to be reduced.

Montezuma District.

TO RESUME WORK.—Walker *Lead Bulletin*, June 4: On Friday last two Eastern mining men, Messrs. Vorhees and Baxter, passed through Hawthorne en route to Montezuma, an old mining camp in the southern portion of this county. In the early days the mines of Montezuma district yielded rich though rebellious ore, but owing to the great cost of transportation and the primitive manner of mining and milling then in vogue, work was discontinued. The property has now fallen into the hands of energetic Eastern men, and if Messrs. Baxter and Vorhees report favorably, work will be resumed at once. These gentlemen were favorably impressed with Hawthorne as the site for smelting furnaces, and promise on their return to devote several days to an examination of our mines.

Oceola District.

GOLD PLACERS.—Nevada *Transcript*, June 7: The big ditch at the Oceola placers, at the base of Jeff Davis peak, Eastern Nevada, the construction of which James Marriott, formerly of North Bloomfield, has been superintending, is completed. It brings an immense supply of water for hydraulic mining. There is a great field that will not be washed out in 20 years. It is not only rich in fine gold, but also in huge nuggets. A mass of gold worth several thousand dollars was taken out of the placers years ago, when some work was done on a small scale. The parties who now have the mine are going to work with the best of apparatus, and will use electric lights in order to run day and night.

ARIZONA.

MILL RUNNING.—Tombstone *Prospector*, June 6: The Sterling silver mill is running a hundred tons of ore from the Bunker Hill mine. This company is purchasing some ore also on the outside and paying cash for it.

TOMBSTONE.—*Prospector*, June 7: The State of Maine is shipping at regular intervals and keeps the same force of men at work. At the Uncle Sam the north extension of the State of Maine ledge is being opened up in good shape. The Randolph shipped a carload of ore last week and is still taking out ore from the same streak. The Diamond litch is being worked by two parties of chloriders who must be doing well as they bought a new whim and put it in place last week. The Sterling Silver Mill is running steady on ore from the Turquois and Bunker Hill mines. The T. M. & M. Co. are steadily working on four of their properties and making regular shipments of about 300 tons per month. They have any amount of mining ground that has never been explored yet, but the company is prospecting it as fast as the output of the mines will pay for doing it. In the Lucky Cuss they reached water level in a winze from the 5th level where they found that they can sink their main shaft 85 feet further before reaching water, and which they intend to do soon. At the Northwest small feeders of ore are followed with the expectation of finding the continuation of the rich old ore chimneys.

QUICKSILVER.—*Journal-Miner*, June 3: The editor of the *Journal-Miner* recently paid a visit to Copper Basin, in company with H. A. Owens, a miner of many years experience, to look at the cinabar claims of Mr. McNary and son. They have, in all, 13 claims located, and have done a little prospecting on the surface of several of them. One shaft is down to a depth of 30 feet, and shows ore all this distance, while croppings can be seen covering the hills for a mile or so in extent. The locators of these claims are poor and are in no condition financially to prospect the property, but the showing made by the work they have already done is certainly of an encouraging nature and would justify a mining company to expend a considerable amount of money in developing the property. Both of the visitors mentioned above were surprised at the apparent richness of the prospects. The ore taken just as it comes from the mine gives a percentage far above that required to pay expenses. Mr. McNary and his son have a bottle of pretty nearly pure quicksilver, which they obtained from the rock in the most primitive method by means of heating in an ordinary metal quicksilver flask, with a pipe screwed into the top of it, the pipe leading into a vessel containing water, where the quicksilver fumes were condensed and caught. The opening up of this property, should it hold out on development as well as indicated by surface croppings, would certainly be the means of making one of the largest mining camps in Arizona. The claims are located within 12 or 13 miles of Prescott. Water is in abundance within a mile of the claims, while plenty of wood is also convenient, making the working of the property a practical proposition.

COLORADO.

STRIKE IN QUEEN'S GULCH.—*Aspen Times*, June 6: A strike has been made in the Dubuque tunnel in Queen's gulch that gives promise of being one of the most important that has been recorded in this district for a long time. It has been definitely ascertained that in drifting south from the tunnel a streak of ore has been opened up that is somewhere from five to eight feet thick and that runs very high. The Dubuque tunnel is on a group of claims owned by the Castle Rock Mining Co., which claims are under lease and bond to a party of gentlemen headed by ex-President John Scott of the Midland railroad. S. M. Boyer is manager for the lessees, and other Aspen gentlemen are interested in the enterprise. Several months ago the tunnel struck the contact after having been driven about 675 feet. The contact looked well, and it was determined to drive another tunnel at a point lower down in order to cut the lode some 400 feet deeper. This second tunnel has been driven 100 feet, and it is expected that it will reach the contact in about 30 days. In the meantime some drifting has been done from the Dubuque tunnel, and it is in the south drift that the present strike has been made. The contact in which the ore has been found is somewhere from 20 to 30 feet thick. The ore was first met with about two weeks ago and has been continually improving from that time

to this. Parties who have recently visited the property state that it is the best outlook for a big mine that they have ever seen. Assays from the ore body run all the way from 1000 to 5000 ounces, and the entire pay streak is said to be very high grade.

DAKOTA.

AT THE CALEDONIA.—*Deadwood Pioneer*, June 6: It was reported late yesterday afternoon that the Caledonia mine was flooded with water, and that all the men were compelled to quit work. The report that the mine was flooded could not be verified, but it was positively stated that the men had quit work on account of some unexpected occurrence at this mine.

FLOAT.—There is no boom or great excitement prevailing in oil, but slowly and very surely the big drill of Kilpatrick Bros. & Collins, of Newcastle, is going down after a flow of oil, and then you who have kerosene, look out. A miner in from Hill City last evening reports the greatest activity in that camp. James Wilson is bonding mines every day and is paying up on those previously bonded. A stream of money is going out to mine and claim owners every day. He, our informant, made a sale to Mr. Wilson of a good mine, for which he received, spot cash, \$13,000. He was informed that Mr. Wilson would disburse a half million dollars before he returned to New York.

IDAH0.

ANOTHER STRIKE IN THE RED ELEPHANT.—*Wood River Times*, June 4: Another ore body has just been uncovered in the Red Elephant, at the extreme northwestern part of the present workings, in a crosscut run in a westerly direction for the purpose of determining the location of an ore chute cut by a raise some time ago. The new find is now fully three feet in width, of first-class ore carrying a large amount of gray copper, and promises to be extensive, as it has already been followed three or four days and has improved right along. The Red Elephant is opening up splendidly, and will evidently give employment to a large number of men and prove very profitable to its owners.

THE CAMAS NO. 2.—The \$2800 gold brick brought to town yesterday, and which is the result of the cleanups of the last ten days' run of the Camas No. 2 mill, was sent to the United States Assay Office at Boise to-day. It weighs about 14 pounds and is worth about \$15 an ounce. This gold was caught on the plates, but it does not constitute the whole yield of the property during the time stated, as between three and four tons of concentrates worth about \$50 per ton were also extracted from the ore put through the mill during the same time. Reckoning the free gold and the concentrates together, the yield of the No. 2 during the past ten days therefore averaged over \$400 per day, or at the rate of about \$150,000 per annum. The actual cost of operating the property does not exceed \$200 per day. This, while not a very astonishing yield for a mine property, is nevertheless very gratifying. It is especially so to those old-time friends of the gold belt who have heard so many so-called experts gravely express the opinion that there was not a claim upon it that could ever be made to pay.

NEW DISTRICT.—*Idaho Avalanche*, June 7: Mr. B. H. Hyde of Oreana paid our town a visit on Wednesday. He informed us that a new mining district had been discovered on Poison creek, but just where he did not know. The lode found is about 40 feet wide, carrying some very rich silver ore. The lode was discovered by a sheep-herder, who informed Mr. H. W. Brown of Oreana, when the latter at once went to the lode and had some work performed. Mr. Hyde showed us a piece of the ore which carried a good deal of metallic silver. The lode lies between granite and slate. There is great excitement in the valley over the discovery, and as a result the country in that vicinity will be thoroughly prospected.

HARRISON.—*Ketchum Keystone*, June 7: Thomas Popham of the Harrison mine, at Boyle mountain, was in town this week having some assays made of samples of ore from his mine, with the following very flattering results: No. 1 gave 450 ounces silver and 72.60 per cent lead, and No. 2, 135 ounces silver and 59.50 per cent lead. These samples were from ore taken 62 feet from the surface. Mr. Popham says the vein averages about 2½ feet wide, four inches of which is high-grade ore. A tunnel has been run in on the ledge a distance of 181 feet, which will give about 84 feet of stopping ground from the end of the tunnel. T. B. Keller returned from a trip to the Buckskin mine last Tuesday and reports the mine looking well. He says that they have from four to seven feet of high-grade ore, and that in the last nine days four men have taken out about 40 tons of ore.

EAST FORK.—Our informant says that the mines and mining matters in general throughout the district are in a prosperous condition. It is expected that the North Star concentrator will start up in a few days. Mr. Thos. Rowe is foreman.

MONTANA.

ANACONDA AND ST. LAWRENCE.—*Butte Inter-Mountain*, June 7: At the Anaconda and St. Lawrence progress on the hoisting of the water from the Mammoth mines is progressing as favorably as the condition of affairs at present existing will permit. As fast as the water recedes the shaft is placed in serviceable condition by a force of men especially detailed for doing that particular work. The upper drifts are now free from water and is also receiving attention and is being put in a condition that will allow of the taking out of ore at the company's earliest convenience. Ore from those levels can be taken out while progress is being made in getting the water out from below that point. The steel tanks continue to accumulate copper as they are used and when sufficiently long in use to become dangerous they are replaced by others that are always ready at hand and no delay made in the hoisting.

NEW DISTRICT.—*Butte Inter-Mountain*, June 6: From Mr. A. H. Hedley, who is just in from near Jefferson Island on the line of the Butte & Gallatin road, it is learned that some rather important quartz discoveries have lately been brought to notice in that section. The district is named Cardwell, and is situated in the foothills and mountains three miles north of Jefferson Island. Up to this

time some 30 or 40 claims have been located, and although the development done is not very extensive as yet, the showing made is unusually good. The course of the veins is northwest and southeast and they are generally strong. One which he is at present developing has a width of between 25 and 30 feet. The locations thus far made cover the belt of mineral ground for a distance of two or three miles. The formation is porphyry. The ore bodies thus far shown up do not exceed five or six feet in width, but the great masses of paying float rock, which are lying around in great quantities, indicate big ore bodies. The ore is generally pretty high in grade, running from \$40 to \$200 in gold and silver, and carrying more or less copper and lead. Mr. Hedley has recently bonded to the Meader syndicate one group of his claims for \$20,000, and from the showing made there is no doubt of the bond being taken up. The outlook is very promising for a prosperous district.

THE DRUM LUMMON.—*Mining Journal*, June 6: The report has gained currency the past week, though from what source is not known, that the Drum Lummon has of late materially reduced its force at the mine. A careful inquiry refutes the rumor. Instead of curtailing its operations the Montana Co. is making preparations to extend them. A mammoth pump has been ordered from England and work will begin directly on a shaft which will be sunk to a much greater depth than the present workings. The company's last semi-annual report predicted a season of great prosperity for the mine—a prediction well founded, if one may judge from the confidence now expressed by those most competent to judge.

THE LION.—*New Northwest*, June 6: The company put in its new pump and got it to work on the 28th of last month, and it works like a charm. On the morning of the 29th the company commenced sinking, and have been going downward as fast as three shifts constantly at work could go through the ground.

THE McDERMOTT.—The McDermott Co. has had two assays made from 600 sacks of ore now ready for shipment. Assay No. 1 went \$23.56 copper, \$31 gold and \$7 silver; total, \$61.56. Assay No. 2 went \$7.59 copper, \$18.60 gold and \$5 silver; total, \$31.19. Two hundred additional sacks will at once be filled, and next week a shipment of 800 sacks will be made.

THE DUNKELBERG DISTRICT.—Both the Forest Rose and Hattie are looking well. Seven carloads of ore were shipped last week from the Forest Rose, the result of the work for May. The Hattie has several hundred sacks of ore and is now hauling to the Mitchell & Mussigbrod spur at the railroad, preparatory to shipment.

MINING NOTES.—Following were the shipments of bullion from the Butte mines for the week ending May 31: Butte & Boston, 16 bars, estimated value, \$25,840; Lexington, 16 bars, \$31,792; Moulton, 6 bars, \$9456; Clark Brothers, 3 bars, \$2320; total, 41 bars, \$99,408. Last week's shipment from the Bi-Metallic, 26,544 ounces, was the largest ever made from that mine. The output of the Bi-Metallic has been increasing for several weeks, and the appearance of the property is said to be improving at every point. The output of the Granite Mountain for the week ending May 29 was 49 bars of bullion, containing 72,435 ounces fine silver and 149 ounces fine gold.

NEW MEXICO.

DEVELOPMENTS.—*Silver City Enterprise*, June 6: A shipment of \$500 in bullion was made from the Atlantic last week. New triple-plated electroplates have been ordered for the Pacific mill. M. C. Jay of Georgetown returned Tuesday from Socorro. The car of ore which he took to Socorro returned \$3683. Two and a half tons of gold ore from the St. Helena of Central yielded \$138 through the arastra treatment. Considerable fine gold was carried in the tails. The output of the Graphic mine in Cook's Peak district, during the month of April, is reported to have netted \$12,000 above transportation and reduction. The *Enterprise* is reliably informed that Geo. W. Eustice did not ship any of the machinery from the Carlisle Co.'s property except the plates, which were sold in San Francisco. W. H. Loomis of Lone Mountain made a rich strike on the west slope of Lone Mountain. The claim is called the Good Luck. The vein is seven to eight feet in width, the whole of which assays from 10 to 15 ounces in silver, while a rich streak of from three to four inches runs 2178 ounces. Wm. Beall has purchased an interest in the property from Mr. Loomis, and has leased and bonded the remaining interest. He is now working the property and taking out good ore.

WASHINGTON.

LEDGE MATTER.—*Okanogan Outlook*, June 3: A powerful steam hoist has been purchased by the Arlington Co. to be used in working their mine. The hoisting machinery and a large quantity of supplies arrived this week for the Fourth of July mine. August Leiber and Andy O'Mally are taking some fine-looking rock out of the Eureka mine in the Lime Belt. The Lady of the Lake is looming up in great shape. Out of an 18-foot bole they have taken about 20 tons of high-grade ore. The Lone Star Co. will ship 50 tons of ore to the Tacoma smelter for treatment as soon as it starts up, which will be in about a month. It is reported by good responsible parties that T. L. Nixon of Tacoma has bonded the La Euna mine to Eastern parties for \$75,000. The Arlington Co. have started to sink 300 feet deeper on the ledge, which will give them a depth of 500 feet. They will also drift from the different levels as they go down. This work will take about a year, but by the time the mill is completed the mine will be in shape to put out ore at the rate of 75 or 100 tons per day. Allen C. Mason of the Lone Star returned to Tacoma the first of the week. During his stay in camp Mr. Mason visited all the principal mines in the Conconully and Ruby districts, including the Arlington, Fourth of July and First Thought on Ruby Hill, and declares that the Lone Star will not take second place with any of them. This visit has only strengthened his conviction that the Lone Star is a bonanza, and no expense will be spared in the opening up of the mine, which will be developed to the fullest extent. The main shaft will be sunk 100 feet deeper, and drifting from the different levels will be continued during the summer.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING JUNE 3, 1890.

- 429,410.—CARPET-FASTENER—P. Beamish, S. F.
429,207.—TOURISTS' HEAD-REST—H. A. Bond, Los Angeles, Cal.
429,374.—SYRINGE—A. E. Charlesworth, Seattle, Wash.
429,510.—BOX-FASTENER—Davy & Dufau, S. F.
429,231.—WAVE FORCE-PUMP—Day & Cole, S. F.
429,191.—SAND-BOX FOR WATER CONDUITS—C. N. Earl, Los Angeles, Cal.
429,209.—FRUIT-PITTER—Elkins & Foreman, Bidwell's Bar, Cal.
429,378.—CLOTHES-DRIER—B. F. Fuller, McMinville, Ore.
429,242.—PORTABLE WINDLASS—J. I. Kinkead, S. F.
429,216.—RAILWAY CAR—Joel B. Low, S. F.
429,362.—SNAP HOOK—Nels Nelson, Aberdeen, Wash.
429,245.—AXLE-SET—W. F. Nightingale, Latrobe, Cal.
429,220.—DRAFT AND LAND-GAGE FOR PLOWS—O. T. Owens, S. F.
429,152.—DIPHTHERIA REMEDY—Lucinda M. Pierson, Goleta, Cal.
429,550.—CLOTHES-PIN—Mary E. Thrall, Riverside, Cal.
429,489.—CAN-HEAD CUTTER—A. S. Wadleigh, S. F.
19,874.—DESIGN—H. J. Crocker, S. F.

The following brief list by telegraph, for June 10, will appear more complete on receipt of mail advices:

California—Anders G. Anderson, West Oakland, tension device for belts; Charles Clements Kropp, S. F., musical notation; John P. Cutler, Los Angeles, pipe-ladder; E. Fish, Los Angeles, steam and gas generator; Melville D. Hemenway, S. F., shattering hanger; Edward C. Lottus and E. H. Booth, S. F., ore-feeder; R. N. Daleo, Palz, Alameda, calendar; Houghton Sawyer, S. F., apparatus for aging wines. Oregon—William L. Gilson, McMinville, grain-separator; Charles W. Treman, Portland, assignor to a prospective mining and machinery company of Oregon, amalgamator; Oles W. Weller, Baker City, ore crusher. Washington—Charles N. Henschel and H. E. Hall, Spangle, header-brake; Nathan A. Wheeler, Alpowa, wagon-brake.

Notes.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast Inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

DRAFT AND LAND GAGE FOR PLOWS.—Owen T. Owens, assignor to the Benicia Agricultural Works. No. 429,220. Dated June 3, 1890. This draft and land gage for plows consists of a draft bar having its rear end swiveled to a depending yoke beneath the beams to which the plows are attached, a guide through which the front end of the draft-bar passes and within which it is allowed a vertical movement, horizontal transverse guide-bars upon which this guiding yoke travels from side to side, a lever by which it is adjusted, and a holding-rack and the means for altering the points of attachment of the rear end of the draft-bar. By means of these adjustments and the free vertical movement allowed to the draft-bar within the yoke, the work is very much improved and the draft upon the horses is made very much lighter.

RAILWAY CAR.—Joel B. Low, S. F. No. 429,216. Dated June 3, 1890. This is a car for steam and street railways, though especially for the ordinary railways of cities and towns. The invention consists in the novel construction and arrangement of the seats, sashes and sides of the car, the object of which is to enable and facilitate the ready and easy conversion of the car from a closed to an open car, and vice versa, thereby adapting the same car for use in all kinds of weather. Cars of this style have been put in use on the Post-street line of cable railway in this city and found to be very successful, answering the purpose in every particular. The change from open to closed or closed to open can be made very quickly and while the car is in motion.

PORTABLE WINDLASS.—James I. Kinkead, S. F. No. 429,242. Dated June 3, 1890. This is a device which the inventor calls a portable windlass, which is designed to take the place of blocks and tackle and which may be used for the application of power to move loads. It consists of a light frame of iron, steel or other metal having the windlass shaft journaled across it near the center, with suitable crank attachments and guides formed integral with the frame, through which the rope passes, together with swivel attachments for anchoring ropes or chains, and certain details of construction. This windlass may be carried from place to place in the hand in the same manner as the block and tackle, the device being easily fixed and applied for the purpose of transmitting power.

AXLE-SET.—Willard F. Nightingale, Latrobe, El Dorado county. No. 429,245. Dated June 3, 1890. The object of this invention is to provide a simple and readily operated tool or implement of this class which will accurately determine the set and gather of the axle-splindle.

MECHANICAL PROGRESS.

A German Substitute for Scotch Pig.

Mr. Juenst has conducted a series of experiments in the Gleiwitz foundry in Upper Silesia, mainly with a view to produce a cheap material and thus emancipate the continental foundries from their present dependence on English and Scotch iron. The Scotch pig-iron, according to Gautier, its prominent qualities exclusively to its richness in silicon. He further maintains that the superfluous graphite in gray pig produced at a high temperature is eliminated by adding ferro-silicon to the latter, and that gray pig obtained by adding silicon to white pig becomes denser and more homogeneous than natural gray iron in consequence of the elimination of graphite. Silicon decarbonizes iron that contains manganese with greater difficulty than iron free from manganese; sulphur influences but little the formation of graphite, but opposes somewhat the decarburizing property of silicon.

Mr. Juenst found the statements of Turner, Lebedur, Wood and Gantier relating to the effect of silicon on cast iron to be generally correct. His experiments show that silicon adds to the density and strength of cast iron, and that ferro-silicon can be applied with advantage and without difficulty whenever the chemical composition of the material is approximately known. The suitable texture of the material can be obtained by remelting gray pig or by adding ferro-silicon. The German process of fusing together gray irons in order to produce castings of great strength is thus proved to be incorrect, although at the present high price of ferro-silicon it is still advantageous to employ gray pig iron for casting of only ordinary quality.

As to the most economical quantity of silicon in the ferro-manganese, 10.38 per cent proved to be the best; at 5.32 per cent the strength was great, but the product in other respects rather poor, probably because the necessary quantity of free silicon necessitated the presence of a great deal of manganese in the ferro-silicon.

Manganese and phosphorus up to one per cent, and sulphur up to 0.16 per cent, had no injurious effect.—*Berg & Huttenw. Ztg.*

THE HISTORY OF COMPOUND LOCOMOTIVES dates back to 1852, when two were built in England. The first American engine of this type was built by the Remingtons, at Ilion, N. Y., in 1870, for the Worcester & Shrewsbury Railroad Company. At the present time there are several hundred running in different parts of the world, mostly in Europe. The higher the pressure is raised, the more efficient steam will be, but 200 lbs. gauge pressure per square inch is about as far as is desirable to go, on account of the high temperature. Recent experiments with high-class modern locomotive boilers gave evaporative rates, from and at 212° Fah., of 5.68 lbs. with anthracite, and 7.2 with bituminous coal. Anthracite is far less efficient as a fuel than bituminous coal and should only be used for special reasons. Compound locomotive engines have shown good results in overcoming cylinder condensation—much better than either steam jacketing or super-heating. "Such result," said W. F. Dixon, when speaking of the efficiency of locomotives at the recent Cincinnati meeting of Mechanical Engineers, "is usually attributed to reducing the range of temperature per cylinder. Although this is probably true of slow-working engines, it is hard to see why it should be of fast-working, as indicator cards from ordinary single expansion express engines show very slight evidence of cylinder condensation. If the high pressures which have almost always gone with compounding cannot be held accountable for resulting economy, it is likely that the solution may be found in the fact that compounding makes high degrees of expansion imperative."

MAKING A STONE DRILL—A correspondent of the *Blacksmith and Wheelwright* gives the following suggestions, drawn from his experience, which should be followed in making, turning and sharpening a stone drill: First, in making a drill do not draw down the steel, but cut off each side and then upset back to widen the bit, making strong or light to suit the hardness or softness of the stone to be drilled. Next place the drill in the vise and trim off, then lay it down until cool, and then file and temper. Draw the temper twice to a deep blue and you will then have a tool that will drill without cornering a hole, and one that will also stand much better than an ordinary drill.

SOMETHING NEW IN REGARD TO STEAM.—Mr. F. G. Fowler of Bridgeport, Conn., recently addressed a society of engineers in that place respecting an alleged discovery in regard to steam, which he thinks may prove of vast importance. He showed how under certain conditions and circumstances the pressure of steam in a boiler can be doubled instantly, without additional heat; a fact which may possibly account for the many mysterious boiler explosions that are of so frequent occurrence. The combinations used in the experiments were produced by Mr. Fowler, but the same conditions are liable to occur without human assistance, and in such a case an explosion is almost certain, as the experiments proved. The conditions, it is stated, were the result of combin-

ing gases with the water in the boiler. These gases are of no benefit, but rather a detriment, but still they exist and occasionally make their presence known in a disastrous explosion. The removal of these gases, it was shown, would remove the cause of explosions. There appeared to be good evidence shown that a great discovery has been made, which if successfully developed will prove of immense value in steam engineering. His claims were demonstrated by a small boiler in which the pressure was raised to 40 pounds, and after being removed from the fire suddenly thrown to 80 pounds.

INCREASING THE SPEED OF LOCOMOTIVES—An interesting lecture was recently delivered by an engineer, Mr. Geitel, before the Berlin Polytechnic Society upon the demands made in our time upon locomotive builders. Locomotives are required which will cover 90 kilometers in an hour. This speed could be obtained by increasing the sizes of the cylinders, boiler and axles. But the engineer is forced to keep the locomotive within certain prescribed limits; the normal height is 4.8 meters. A further restriction is formed by the maximum weight fixed by the police. Another difficulty consists in the task of bringing the size of the boiler and cylinder into accord. The new means of increasing the working capacity of the locomotive consists in the steam which drives the locomotive being utilized to the utmost possible extent by allowing it to again perform its work in a high-pressure cylinder. High and low pressure cylinders have for some time been employed in marine engines, and they are also coming more and more into use for locomotives. Forty-nine were so fitted last year, and this year the number has already reached 87. Although the cost of locomotives with the two sorts of cylinders is greater, a compensation is found in the more economical consumption of steam, the saving in coal being equal to about 20 per cent. A further advantage is afforded by their increased working capacity.—*Kuhlow's.*

THE NEW METHOD of manufacturing articles from copper by electrical deposition seems to be attracting much attention, especially in England, where the idea originated. The process is considered by some as second only to the Bessemer process. There seems to be practically no limit to its application. Large tubes, vats, cylinders, and the like can be made direct from rough copper far cheaper than by any other process. The electrical conductivity of the annealed copper is greater by $\frac{1}{4}$ per cent than that of the best commercial copper; and the copper can be varied in tensile strength and ductility according to the requirements. The process is not confined to copper. It is equally applicable to nickel, silver or gold. A silver-plater in St. Louis recently placed a fresh egg in his silver bath. The result was a delicate work of art—a silver egg. After having the egg in his possession over a year, he broke it and was much surprised to find it as fresh as when first laid. Here was a new discovery, and subsequent discoveries led to the fact that many perishable substances, such as fresh and cooked meats, from which the blood had been expelled, cheese, the most perishable fruits, such as bananas, peaches, grapes, etc., could be preserved indefinitely by this mechanical process. He asserts that the process may even be successfully applied to embalming.

CAN IRON BE TEMPERED?—It has been the general opinion always, we believe, among blacksmiths that iron could not be tempered. Mr. E. K. Wehry of Lost Nation, Iowa, claims that it can be tempered, and he has sent us a piece of a horseshoe which goes to prove the truth of his assertion. He says in a letter to us on the subject: "You will see that I claim iron can be tempered or hardened so that a new file cannot touch it. To prove what I claim, I send you by to-day's mail a sample of a heel of an old horseshoe tempered in the same manner that I temper all the new shoes that I set. You will see that at last a way has been discovered to harden iron successfully. Although thousands of blacksmiths will tell you that it cannot be tempered or hardened, I am willing to put up \$50 that I can temper any kind of iron with fire and water alone, no drugs of any kind to be used." This opens up a very interesting question for the consideration of our readers, and we should like to have a general expression of opinion from them on the novel subject of tempering iron. We shall hope to print in our next issue the views of quite a number of our readers.—*E. & W.*

TEMPERING COPPER—AN INTERESTING FACT. C. S. Griffin writes as follows to the *Belfast Journal*: "I have recently learned a fact that may, if generally known, lead to the tempering of copper. A man at work on the telegraph wires here had hold of a copper wire with nippers on one line trying to make a short circuit, when the handle of his nippers touched the copper wire, and instantly a piece of his nipper was melted off and a piece of copper had formed on the point of the nippers, and on trying to file off this copper he found it was tempered to such a hardness that the file would not cut it. My brother, S. C. Griffin, tried to file it to make sure that it was really tempered. The ancients knew how to temper copper, but no modern genius has been able to temper it. As copper is a finer metal than iron, if it could only be tempered, it would make edge tools vastly superior to anything we now have, hence the importance of the discovery if once made practical."

SCIENTIFIC PROGRESS.

Prehistoric America.

Prof. F. W. Putnam recently read a paper before the Archaeological Association of the University of Pennsylvania. After congratulating the association upon having secured the services of such a competent archaeologist as Dr. Abbott, once his assistant at Cambridge, he said: "Surface-found collections are of interest, but they do not give the history of a people as does the excavation of a burial-place or a village site, and it is to be hoped that the new museum will devote itself to such explorations. Collections have already been made that show as much as can ever be hoped for from mere collecting. We should not only try to bring specimens together, but endeavor to find out who the people were, the direction of their migrations, and whether those of the North and the South were the same."

Prof. Putnam then declared his belief that the American Indian was the resultant of a mixture of races. "Two well-defined groups of races are found in America. They have entirely different shaped skulls. One group starts in Mexico and extends to Peru. They are a short-headed people. They extended across from Mexico along the Gulf coast, up the Mississippi valley and along the southern portion of the Atlantic Coast, not crossing the Alleghenies or found north of the Great Lakes. They were the people that built the mounds and founded the civilizations of Mexico and Peru."

"The objects exhibited from Wisconsin were made by another stock, a long-headed people who inhabited the northern part of the country. These two races have met and intermingled, and the result is the American Indian."

Prof. Putnam exhibited a series of photographs of copper ornaments found in a mound in Ohio. These objects, which number many thousands, had been thrown in a kind of fireplace about four feet square, where they were found. Notable among the ornaments were square plates of hammered copper, perforated with holes, and a large number of earrings, many of which were covered with thin sheets of silver and some with gold. A single ax was the only implement found. The existence of ornaments and the absence of implements is important in associating the old race of Ohio with the people of Mexico and Peru. Very few ornaments are discovered among the copper objects made by the northern stock. Not the slightest trace of smelting, however, is to be found, the metal objects found in the mounds, even galena, being cut in ornaments and not smelted.

Facts bearing upon the prehistoric condition of America are rapidly accumulating, some of which go to prove an antiquity of the human race on this continent equal to, if not exceeding, that assigned to man in the Old World. Implements have been found in various parts of the United States the age of which is estimated by different authorities at from 7000 to 100,000 years.

A finely wrought miniature image was recently brought to light in boring for an artesian well at Nampa, Ada Co., Idaho. It was taken from the eleventh distinct geological stratum pierced by the boring close to the twelfth stratum, which is of sandstone. It is apparently modeled from stiff clay, and if baked at all in the fire had been subjected to only a low degree of heat. The bearing of this discovery is of great importance. If we are compelled to ascribe to the image such antiquity as its geological situation indicates, it will go far to relieve the Calaveras skull of the obloquy which has rested upon it on account of its advanced stage of development; for certainly the brain that could have modeled so perfect a form as this must have been far removed from that of the ape-like progenitor supposed by Darwin to be the common ancestor of us all.

The Color of Human Beings.

The Sanscrit word for caste is *varna*, "color." India was inhabited originally by non-Aryan dark tribes. When the fairer Aryan race forced its way into the land, they recognized at once this difference between themselves and the indigenous tribes, and upon this foundation they built up their system of caste, which is generally ascribed most by those who understand least of it. Now the white skin of the Anglo-Saxon and the Anglo-American is to him precisely as much of a caste-mark as it was to the priestly caste of the Aryans when they invaded India. Formerly the belief prevailed that the dark races owed their color to a special dark layer of skin tissue. Microscopic investigations have shown that this is not the case. The skin consists of two layers, the outer, called epidermis, and the inner skin proper (cutis). The outer skin again consists of two layers, a transparent skin and a mucous tissue, called the malpighian net (*rete malpighii*). In this tissue, which lies between the true skin and the outer layer of the epidermis, are contained cells full of finely granulated pigment, or coloring matter. The upper part of the epidermis of a negro is just the same as that of a white man. According as these pigment cells are more or less numerous, the complexion is more or less dark. In all human beings there are some parts colored precisely in the same way, the nipples, freckles, moles, etc.

On the color of the skin depends the odor of

the exhalation. Those of the negro are generally described as rancid, ammoniacal, goatlike; in times happily past, the smell was wafted by the breezes and gave notice of the arrival of a slave ship. The American races have their own peculiar smell. Especially strong and repulsive to the Spaniards is that of the Aranaonians, the aborigines of Chili. The creoles have a special name for it, *soreno*. Indians have been known to express aversion against the white man's smell. It is evident from what has been stated just now that dark color is not due from influence of light and heat, in the ordinary way of browning from the outside owing to exposure. The cause of race color is much more difficult to account for. This much is certain, that there is evident connection between latitude and color. Even the ancient geographers, e. g., Pliny, believed that dusky skin meant origin near the equator. Certainly the deepest shades of black are at home only near the equator, in Africa, in India and New Guinea.—*Baltimore Sun.*

THE ORIGIN OF MAN AND ANIMALS—"The arguments drawn from the experimental facts of variation and natural selection from the observed progression of animal forms in successive geological strata, and the like," says Mr. Wallace in the *Popular Science Monthly*, "seem to me quite inadequate to explain the development of insects, fishes, birds, mammals, from one stock. Consequently, to my own mind, it is a relief to be able to think of several, and if of several then possibly of any number of original germs. The hypothesis is not opposed to, but quite in accordance with, Mr. Darwin's own views; in fact, he was far too cautious a man to dogmatize concerning the unity of the origin of living forms, when all attempts at the examination of the question of origin would necessarily carry him far beyond the limits of possible experiment. Let us then adopt provisionally the hypothesis of a multiplicity of germs of life; and if we do this, there is nothing wild or strange in the supposition that the germ of man was different from other germs. It would be beyond all that scientific caution would justify to assume that, given a number of original germs of life, it is a matter of chance into what each will develop. It is contrary, I think, to the whole analogy of Nature to suppose that a living germ, which is to all intents and purposes an ovum or egg, may ultimately develop into an oak or a fish, or a man, according to its surroundings or according to mere chance. At all events, it is much more probable, much more according to analogy, that each germ should have its specific character, and that so man should have been man in intention and preparation from the very beginning of things."

TORNADOES—The increasing frequency and greater destructiveness of tornadoes is attracting an increased share of scientific research into their character and cause and the means of preventing their destructive effects. Lieut. Finlay of the United States army, in an article on tornadoes, argues that these storms will come while the earth has an atmosphere, but believes that when navigation of the air shall have been made practicable, important researches might be made into the conditions which give rise to the tornado. Science, however, has so far offered little hope of solving the problem of aerial navigation. The late Louisville cyclone was probably one of the most formidable visitations of the kind on record, and presented most striking evidence of the destructive power of Nature's forces and man's insignificance in their presence. An examination of the ruined district, however, has revealed the fact that several buildings directly in the track of the most violent points of the disturbance, withstood the shock without serious damage. It has also been noticed that those buildings are of the most solid and substantial structure. This fact is one of much importance to architects and builders, as showing that the science and art of architecture has reached such a degree of efficiency as to render it possible for man to protect himself against the most extraordinary atmospheric disturbances of which we have any knowledge, and fairly avert their death-dealing effects. Late experience has shown that the element of safety from atmospheric pressure should enter more fully than heretofore into all architectural designs. The public at large should be alive to this matter and see that buildings which shelter families are properly constructed for resisting these extraordinary contingencies.

THE HELIOGRAPH.—During a recent trial with a heliograph in Arizona, a single sun-flash was sent from Fort McDowell to Fort Grant, 125 miles distant, where it was properly received, and from whence it was continued to Fort Huachuca, 90 miles farther—making 215 miles distance with one intervening station.

A SUNFISH of the genus *Orthogoriscus* was recently captured in the deeps between Lynn, Wisbeck and Boston, England, the first seen in that vicinity in 70 years. It measured from fin to fin $7\frac{1}{2}$ feet, and was $5\frac{1}{2}$ feet in length, weighing 750 pounds. It has been preserved.

THE "ANGLER" says dohsons or helgramites, a popular bait, are found among the dead leaves which lie at the bottom of stony brooks. Lift out a peck of the leaves with a hoe, and open them out on the bank, when the dohsons will crawl out.

THE BUILDER.

A NOVEL DESIGN FOR THE WORLD'S FAIR BUILDINGS.—A most striking design for these buildings at Chicago has been prepared by an architect of that city. He proposes to build a huge tent of iron, steel and stone, with glass roof and a central steel tower, 86 feet in diameter and 1100 feet high. This will contain eight elevators. From its top, steel cables will be stretched to the circular side walls, which will be 1500 feet from the base of the tower. Upon these cables the glass roof will rest. This will give an enormous circular building, 3000 feet in diameter, which, with the ground floor and two circular galleries, 75 feet wide, running around the building, will provide 193,000 acres of available space. By the aid of electric lights this enormous space would present magnificent vistas. Mr. Jenison asserts the practicability of such a structure. A reference to the Brooklyn bridge gives a comparison. That has a span of 1560 feet, while the cables of this building will be 1500 feet long. The bridge will support a moving load of 100 pounds per square foot, while here there will be only 10 pounds plus the wind pressure. This latter point has been carefully considered. A round surface will offer less resistance than any other, and the wind pressure can be successfully sustained by carefully adjusted tension rods. A considerable revenue would be derived from the elevators. The cost is estimated at \$5,865,000, or \$36.204 per acre. The Paris Exposition machinery hall cost \$75,080 per acre; the main building at Philadelphia \$73,591 per acre, and the London Crystal Palace, \$42,500 per acre. Of this cost about \$1,000,000 could be realized from the use of the old material. The exhibits could be arranged in converging lines toward a grand amphitheater around the central pole. Mr. Jenison proposes also a large circular canal around the inside of the building for various purposes. This is certainly the most captivating of all the novel projects yet proposed in connection with the exposition.

CARPENTERS' HORSES.—A Chicago genius has something to say about the wooden horses used by carpenters: The life of a horse is short, averaging about one-half the ordinary building season. If the average contractor were asked as to the number of horses in use in Chicago at a given time, he would probably answer, "I don't know." Our genius interviewed a great number of contractors, bricklayers, plasterers, etc., with the following result: A horse will average about 30 feet of lumber, and there are about 50,000 horses in use in the city today; double this for the season, and we have a total of 3,000,000 feet of lumber every year put into these awkward but useful and indispensable adjuncts of the building trade. The cost of horses is all the way from 60 to 75 cents each. This would make the estimate of the number here given much too small but for the further fact that many of the lesser concerns, who work only on small dwellings, make their horses last longer than here stated. Carpenters make them by the piece for the masons and plasterers, and evidently make a good thing of it. Why no one has thought to start a shop with a little outfit of suitable machinery, is a wonder. A better and cheaper horse could be made, and there is a pretty good chance for a business that involves the use of from 2,500,000 to 3,000,000 feet of lumber annually, or a business of upward of \$50,000. Many of the contractors have expressed the wish that there was such a concern, where they could send any time and get just what they want, and at a reasonable price. Who will make the venture?

ELECTRICITY IN PHOTOGRAPHY.—An English photographer claims to have obtained a photograph in which the natural colors were reproduced when the exposure was made, by accident, just at the moment when there came a blinding flash of lightning. He says that a friend of his once got a colored plate under similar circumstances, and believes that electricity has to do with photographing colors.

A STEM-WINDING SCREW-DRIVER has been made in Philadelphia, with the handle in two parts, these parts being capable of rotating one upon the other. A stop-pin and pawl limit the movement of the shank in one direction, while the top of the handle will move backward without turning the shank. The mechanism appears to be very similar to the principle of a stem-winding watch.

BUILDING WITH BRICK.—It is remarked that the central portion of a brick for building purposes is of little value, and could be left hollow as well as not where the material is an item to look out for, provided it makes no more work for those in the brickyards. They are to be stood on end, of course, to keep rats and other vermin from making use of the cavities in the basement.

FIREPLACE CONSTRUCTION.—Nothing is more cheerful in cold weather than an open fireplace, says the *Building Trades Journal*, but it has always been considered the most wasteful of fuel. There are, however, certain rules in fireplace construction, that, if followed, will reduce the waste to a minimum. The back wall of the fireplace should not be less than twelve inches from the face of the chimney-breast for soft coal or wood, and eight inches for hard coal. This wall should be carried up perpendicular for about six courses of brick and then inclined

forward so as to contract the throat of the flue. The top of the projection thus formed should be perfectly level, and should be about six inches above the chimney bars. The sides and top plate of the fireplace should be at right angles to each other, and each should form an angle of 135 degrees with the back wall, whose width should be one-third that of the front. By this arrangement the greatest quantity of heat is reflected into the room.

USEFUL INFORMATION.

WHAT THE WORLD OWES TO WORKINGMEN.—Said Sir John Lubbock recently in a lecture to English workmen: "It is remarkable how many of the improvements to which we owe the marvelous development of our manufacturing industry have been due to workmen. Watt was a mechanical engineer; Henry Cort, whose improvements in manufactures were said to have added more to the wealth of England than the whole value of the national debt, was the son of a brickmaker; Huntsman, the inventor of cast steel, was a poor watchmaker; Crompton was a weaver; Wedgwood was a potter; Brindley, Telford, Maebat and Neilson were workmen; George Stephenson began life as a cowboy at twopence a day, and could not read till he was eighteen; Dalton was the son of a poor weaver; Faraday of a blacksmith; Newcomen of a blacksmith; Arkwright began life as a barber; Sir H. Davy was an apothecary's apprentice, and Boulton, the 'father of Birmingham,' was a button maker. To these men, and others like them, the world owes a deep debt of gratitude. We ought to be as proud of them as of any of our generals or statesmen."

LUSTROUS METALLIC GLASS SURFACES.—The following methods of preparation of lustrous metallic surfaces on glass and glazed ceramic is described in the *Journal of the Society of Chemical Industry*: An aqueous solution of silver nitrate is mixed with a paste which, when heated in a muffle at a low temperature, will not fuse to the glass or porcelain, but can be readily detached from it. Suitable paste may be made from chalk, earth, lampblack, sulphur, madder lake, manganese dioxide and oxide of iron. During the heating in the muffle the silver passes from the paste to the surface of the glass or porcelain. The paste is then carefully removed and the article heated gently for a few minutes in a reducing atmosphere, preferably in carbonic oxide. An adherent lustrous metallic coating is produced which in transmitted light appears light yellow to dark-green white, while the luster varies in appearance from that of silver to greenish gold. Three parts of paste are used for one part of silver nitrate. Chloride of sulphide of silver may also be used, the former imparting a greenish and the latter a yellow color.

ERASING INK LINES.—A correspondent of the *American Machinist* gives the following: It is sometimes necessary, unpleasant as it may be, to erase inked lines, especially on patent-office drawings. The erasing is well enough, but to draw lines over the erased spot, and to be as distinct as any of the other lines of the drawing, is accomplished by erasing the lines carefully without making ditches; then apply with a brush a thin solution of gum arabic with half that of alum; when wet the paper will swell. After perfectly dry, burnish down, and it will be as good as ever, and often better than the paper, for this varies in quality. If the drawing is to be very elaborate, and tinted, it is best to test the paper as to its quality before any inking is done, and apply with a sponge a very thin solution of the same liquid evenly, not let it run into the paper if pools are formed, but remove them—as everybody, I suppose, knows, the paper not being sized in this manner before the drawing is made, will shrink and change the scale—certainly poor paper wants a better treatment than good and homogeneous paper.

TEA CULTURE IN COLORADO.—According to the *Denver Grocer*, a great industry, that of tea culture, has practically sprung up within the State of Colorado. Not many miles from Denver a gentleman is said to have set himself in the most deliberate and determined manner to the solution of the tea problem, from the American standpoint. Careful and continued investigation by him is said to have resulted in the discovery that the conditions of soil and climate existing in several points of Colorado are substantially similar to those in existence in the northern tea districts of China. The progress of this new industry will be watched with much interest.

UNCERTAINTIES OF THE LAW.—Some one of a statistical turn of mind says he has ascertained that out of 14,779 murderers who took human life in the six years from 1884 to 1889, only 558 paid the penalty of their crimes by yielding their own lives to the law.

CHEAP PAINT.—A householder in Bangalore, India, is said to have for years used nothing but the dust off the roads, mixed with linseed oil, as a paint for woodwork exposed to the weather.

HAPPINESS is more in the expectation than in the realization. We chase happiness while unhappiness is continually dogging our footsteps.

GOOD HEALTH.

The Ear-Ring.

The habit of having the ears bored and wearing ear-rings seems to be gradually going out of fashion, and well it may. There is often danger, always more or less trouble, connected with the habit. A melancholy case has recently occurred in this vicinity, which is chronicled as follows:

Miss Cyrena Boyd of Winters, Yolo county, died in San Francisco April 30th, of blood poisoning. While in the city some time ago visiting friends she had her ears pierced. She returned home, but was shortly afterward caught in a severe rainstorm. She took cold, erysipelas set in and she came to this city for treatment. Instead of improving, however, she grew worse, and her ears and face became terribly swollen.

After suffering great agony, death came to the young lady's relief four days later. A telegram was sent to her parents at Winters in time for them to have arrived before their daughter passed away, but on account of some delay there they did not receive the message until too late. Deceased was an attractive young lady, 19 years of age, and a favorite in the neighborhood of her home.

In connection with the above, the following paragraph, which we find on our table, may possibly be read with interest:

There is a certain pleasure in watching the decline and fall of the ear-ring. If I had written "Looking Backward" I should have inserted somewhere a reminiscence of the last woman who bored holes in her flesh to permit the fastening of an ornament. The attempt to revive the Creole, or hanging ear-ring, has utterly failed. The faintest suggestion of weight attached to the ear now displeases most well-bred women. Occasionally you see a face of such a shape that hanging ear-rings are temptingly becoming. Nettie Hooper, the pretty daughter of Lucy Hooper, the Paris correspondent, wore large Creole ear-rings, set with small pearls, at a recent reception, and they accentuated her piquancy, but the hanging ear-ring, as a rule, is an abomination. Even the stud ear-ring is less worn. Fine jewels are less often set in ear-rings, and many which have thus been used are going back to the jewelers to be reset as pendants or in brooches. It is not a usual thing now to see a debutante whose ears have been pierced, and matrons often use various little artifices to conceal the traces of the needle.

INCREASE OF INSANITY.—Recent investigations conducted by M. Paul Garnier and embodied in a report to a convention of French doctors give startling facts as to the increase of insanity in France, and especially as to the increase of that form of insanity due to the excessive use of alcoholic drinks. From 1871 to 1888, insanity increased by 30 per cent. Fifty-six per cent of the insane are men and 44 per cent are women. The increase during the past 17 years has been almost entirely in the branches of alcoholic insanity and of general paralysis or paresis. There has been very little increase in mania, melancholia and chronic delirium. Alcohol and overwork are, therefore, held responsible for the greater part of the increase of insanity during recent years. The frequency of alcoholic insanity has doubled within the past 15 years, and the cases have increased 25 per cent in the last three years. Fifteen years ago the proportion of women among the cases of alcoholic insanity was one-sixth. Now it is one-fifth. A singular fact noted is that the number of new cases of insanity is greater in the spring, the month of May seeming to inaugurate annually an epidemic.

VACCINATION.—The right of the State to require the vaccination of children before admitting them to the public schools has been affirmed by the Supreme Court Commissioners. The efficacy of Jenner's method of preventing the spread of smallpox was recently strikingly exemplified by the experience of the members of Stanley's expedition, an epidemic playing sad havoc with a number of his followers who refused to submit to vaccination, while nearly all who did passed through the trying experience with little or no sickness.

PALPITATION OF THE HEART.—A French physician announces that distressing or excessive palpitation of the heart can always be arrested by bending double, the head down and the hands hanging, so as to produce a temporary congestion of the upper portion of the body. In nearly every instance of nervous palpitation the heart immediately resumes its natural function. If the movements of respiration are arrested during this action, the effect is still more rapid.

THE EYES.—When the average man or woman comes to be fitted with the first pair of glasses, some curious discoveries are made. Seven out of ten have stronger sight in one eye than the other. In two cases out of five, one eye is out of line. Nearly one-half the people are color-blind to some extent, and only one pair of eyes out of every fifteen are all right in all respects.

THE MARRIAGE STATE.—Prof. A. N. Klæver, a Norwegian statistician, has discovered and declared that the marriage state increases the death rate among women and decreases it among men.

ELECTRICITY.

INCREASING USES OF ELECTRICITY.—The increase in the use of electric lights and electric motors is shown by the *Electrical World* to be greater during the past few years than most people probably imagine. The number of electric lighting companies in the United States and Canada operating central stations at the beginning of 1886 was 450. This number had increased at the beginning of 1887 to 750, at the beginning of 1889 to nearly 1200, and at the beginning of 1890 to 1277, including 25 in Mexico and Central America. Meantime 266 gas companies had engaged in electric lighting, so that the total number of companies engaged in electric lighting at present is 1543. The number of isolated or private incandescent and arc light plants at the beginning of 1887 was about 1000 each. Now there are 3925 private plants in the United States, 175 in Canada, and 200 in Mexico and Central America, making 4300 in all. The number of arc lamps in use in 1882 was 6000. This number doubled each year for four years and has since grown rapidly until there are now 235,000. The number of incandescent lights has increased from 525,000 in 1886 to 3,000,000 at present. The number of electric motors now in operation in the country is estimated at 15,000. There are nearly 200 electric railways in over 125 towns and cities, and these have in operation or under contract 1834 cars on 1260 miles of track. Electricians, however, look for a great development of electric motors for railroads of all kinds during the next two years. Electric light and electric power for mining is a new development of considerable promise.

THE MOST PROMISING FIELD FOR THE INVENTOR, very correctly says a contemporary, is electricity. The best inventions in this field have mostly been made in the last 15 years—largely indeed inside of the past decade. Here the field is opening out and widening all the time, as new applications of the electric current or electric energy are being constantly discovered. Already the inventor in this field can be counted by the hundred, and there are, perhaps, more successful ones among them—that is, the ratio is greater than in any other field of invention. Just for a moment look at the prospect here presented. In the electric current we have an element of power that is more easily controlled and handled, more easily diffused over large areas, more adaptable to a greater variety of purposes, than any other of the forces of nature within our control. It will heat fourhouses, do our cooking, furnish us with light, and convey power anywhere that we may desire it to, and in any proportion we may call for. This covers a wide range of application, but it by no means exhausts the uses and purposes to which electricity can be applied, and this field, it will be seen, is therefore a most promising one to the young inventor.

CLEANING FILES BY ELECTRICITY.—An improved means for cleaning files, which is claimed to restore them to the condition of new files, is described as follows: After being cleaned and wetted, the files are dipped between two carbons into acidified water, and the circuit of an electric current is established between the carbons and the file by means of a piece of metal, serving as a support to the file, by which the latter is suspended. The water is then decomposed by the current, the oxygen acting upon the cuttings of the file, while the hydrogen bubbles settle in the teeth and protect them against the action of the acidified water. After immersion for a few minutes, the file is withdrawn and brushed in clear water to remove the oxide of iron, and then replaced in the bath. When the cuttings are entirely cleared, the file should be immersed in an alkaline bath to remove all traces of the acid, then dried and brushed.

A NEW IDEA FOR ELECTRIC WELDING.—It seems that the uses to which electric welding can be put are not yet exhausted. Lieut. W. M. Wood, U. S. N., has conceived the idea of applying the electric welding process to projectiles. He consulted the officials of the Thomson Electric Welding Co., and the experiments were made. So successful were they that letters patent are now being applied for. Heretofore the Government has had to bore into solid metal at a great cost. By the new process a steel tube of the proper length and thickness is welded to the head and then to the butt of the shell, accomplishing in a few minutes what formerly took hours of costly machine labor. The Government officials in the Ordnance department are very much interested in the result of these experiments.

TOADS AND ELECTRIC LIGHTS.—A lady tells how she was recently waiting in a carriage near an electric lamp in Montreal, which had just been lighted, while her friend went to a neighboring shop. In the dry road she saw presently a stir, and, looking over the wheel, saw, hopping in all directions, a multitude of toads moving toward the light. There was a ring of toads underneath, evidently waiting for the moths and other insects that nightly drop from the life-destroying flame. It was a curious sight to witness those curious creatures squatted in a circle, with upturned heads waiting for their snappers which they knew would soon drop into their mouths.



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[NEW THIS ISSUE.]

Assessment Notice—Camelero Land and Coal Company.
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Meeting Notice—Camelero Land and Coal Company.

See Advertising Columns.

Passing Events.

It is apparent that copper is again on the advance, the stocks on hand being rapidly reduced. The French syndicate have disposed of two-thirds of what they had at the time of the collapse. The demand for the metal is largely on the increase.

As a result of the opening of the bids for armored vessels at Washington, it is apparent that the Union Iron Works of this city will have two more vessels to build, one of them a very large ship. It is gratifying to note that the shipbuilding industry on this coast is gradually enlarging.

It has been determined to add to the "California on Wheels" exhibit of the products of California now going about the United States, a lot of mineral specimens to illustrate our mining industry.

The foundry strike still continues with little change in the situation. All the foundries are at work with non-union men, but the members of the molders' union still "picket" the shops and profess to be confident of ultimately getting the best of the Foundrymen's Association. The latter seem indifferent, having men enough for the present.

The Comstock mining companies paid out in wages last month \$249,024. Of this, the Con. California and Virginia paid \$54,592.

Milling Ores on the Comstock.

The sworn quarterly reports of the bullion produced by the various ore-yielding mines on the Comstock lode which were published in April are full of interest to stockholders. An analysis of these reports develops a condition of affairs which is certainly not encouraging for those who hold stock in these corporations.

We find that the Overman mine took out during the quarter ending March 31, 1890, 1670 tons of ore yielding gross \$22,657.19, or \$13.57 per ton. The cost of handling this, including transportation, extraction and reduction, was \$17,914, showing a profit of \$4742.97.

The pulp assays from Overman for the four weeks ending March 29th show an average of \$17.39 per ton; they therefore saved .78 per cent of the pulp assay.

The Savage Mining Company, we find from their sworn bullion report, took out during the quarter mentioned:

4570 tons of ore yielding gross	\$14.40 per ton	\$65,795.76
Cost of extraction, etc.		\$9,718.63

Loss to the company	\$14,922.92
---------------------	-------------

The pulp assays given in the weekly reports of the Savage Company show an average of \$22.27 per ton, as by their bullion report they saved \$14.40 per ton, and saved .647-10 per cent of the pulp assay. The Hale and Norcross Mining Company, we find from their bullion report, took out:

5859 tons ore yielding gross	\$11.55 per ton	\$67,683.98
Cost of extraction, etc.		\$10,359.77

Loss to the company	\$36,890.70
---------------------	-------------

The pulp assays as given by them during the quarter show an average of \$17.57 per ton. According to their bullion report they saved out of this \$11.55 per ton, or 65 74-100 per cent of the pulp assays.

The Consolidated Virginia and California show an output of ore for the quarter of 25,680 tons. Average according to their bullion report \$18.10 per ton. The average of their pulp assays for the same period is \$25.81 per ton, they, therefore, saved .70 per cent of the pulp assay.

The Crown Point Mining Company yielded according to their bullion report 7059 tons of ore averaging \$11.50 per ton. Their pulp assays for the same time averaged \$16.96 per ton, they, therefore, saved 67 8-10 per cent of the pulp assay.

When it is understood that all these ores can be and should be worked up to 85 per cent of the pulp assay, the carelessness in their handling can be easily seen.

The losses to the companies here mentioned can be better understood when they are put into figures.

To the Overman Company the difference between 78 and 85 per cent is.....	\$2,323.30
Savage, difference between 64.7 per cent and 85 per cent.....	19,080.10
Hale and Norcross, difference between 65.74 per cent and 85 per cent.....	19,803.42
Con. Va and Cal., difference between 70 per cent and 85 per cent.....	99,381.80
Crown Point, difference between 67.8 per cent and 85 per cent.....	20,612.28

Waste in five mines which went to the gain of the mills.....	\$161,750.70
--	--------------

Taking the same ratio for the balance of the mines, the loss certainly runs over \$200,000 for the quarter. This all went to the gain of the millmen, in addition to \$7 per ton paid for milling, which on 44,838 tons from five mines mentioned above, amounts to \$313,866. As the assays of the rock delivered at the mills are not given by the companies, it is impossible to tell how close to the true assay value it is worked by the mills. A strong head of water and open screens can make the battery slimes very rich, and no one would be the wiser, as the assay value of the ore as delivered to the mill is not given.

If the losses mentioned herein were necessary and usual, no fault could be found, but they are not necessary, are inexcusable and the result of negligence bordering on something worse.

It is known that the California pan-mill will work ore up to 90 per cent of its pulp assays. Silver mines carrying free-milling ores going no higher than \$15 per ton are sought after as investments and pay good interest.

In the Calico mining district in California silver ores assaying from \$13 to 16 per ton with no gold in them are worked at a profit to their owners and are paying dividends.

Why then should higher grade free-milling ore on the Comstock lose money for the mines that produce them. The loss is plainly in the

mills. They are getting the whole benefit of the work of the mines. They are being paid for milling ores which they are not milling properly and which they are working at a loss to the companies; whereas, if they were worked as they would be in a private corporation where the company owned the mill, they would pay dividends when under the present system assessments are levied to take out the ore.

In other words, stockholders who own paying properties are paying assessments for the benefit of the mill ring. This would not occur if the directors of the several companies would do their duty. In former times when directors made contracts with the mills, there was incorporated in the contract a clause compelling the mill-owners to work the rock to a certain per cent of the car or mine assay value. We believe that 65 per cent was the amount usually given. This is not done now, and the stockholders of the companies are left unprotected and at the mercy of the millmen.

When J. P. Jones worked the Con. Virginia and California under contract, careful assays of the rock were kept by both parties, as is said, for their mutual protection; but the gentlemen who are acting as directors of the various mining companies apparently do not think that there is any necessity for the protection of stockholders, and leave them to be skinned by the millmen.

In view of the peculiar conditions existing on the Comstock Lode, it will not be amiss to consider the effects resulting therefrom. We find, upon investigation, that the Chollar mill is owned by Senator J. P. Jones, Alvinza Hayward and W. S. Hobart. The Union Mill Company is the property of Senator J. P. Jones, D. O. Mills, F. G. Newlands, the Sharon estate and R. F. Morrow. The Nevada mill is owned by John W. Mackay and James L. Flood.

Can it be considered a startling coincidence that among these gentlemen, owners of the mills, are found the millionaires of the Comstock? The paupers are found among the stockholders of the mining companies, who intrust their interests to those who, from personal interest or criminal neglect, sacrifice them and their poor earnings to the mill-owners.

There is nothing new in this story of misappropriation on the Comstock. It is bare-faced and without cover. There are few in the State of Nevada, he they deaf, dumb and blind, who know not of it. It has been said that with such general knowledge it is strange that such illegal acts can be perpetrated.

The Board of Directors who are managing these mines are continued in power by the proxies given them by the parties in whose names the stock stands. As the most of the stock is in the name of the brokers, it is evident that they are furnishing the power with which they are destroying their business. There can be no healthy condition of mining shares until the present wholesale looting of the mines is stopped.

Why should manipulators make a market to sell their goods when they can get all there is in the mines through their mill system and all the money the people have through their Boards of Directors and the assessment system. A crumb is occasionally thrown to the brokers just sufficient to keep them from absolutely starving and keep them from getting restless under the lash.

That the brokers connected with the stock exchanges here are so blind to their interests as to continue in power those who are constantly destroying and rendering valueless the very properties upon which they, the brokers, are dependent for their income, is beyond the understanding of any reasonable man.

Would the New York Board of Brokers, or any other board of brokers in the world, stand listless, and without remonstrance or resistance permit any board of directors of any organization listed and daily dealt in by them wreck and ruin the property intrusted to them and wreck and ruin the people who trusted them with its management? Would they aid such board or boards of directors by lending them their property, or that of their customers, with which to carry out their nefarious schemes? We think not, but it is done constantly here in San Francisco with the mining companies on the Comstock lode. There certainly never was anywhere in the world such a condition existing as exists in stock circles here to-day.

If a discovery is made on the Comstock with

money received as assessments on stockholders, the ore contained therein goes to the enrichment of the mill-owners, and in some instances further assessments are levied to take the ore out.

More Cruisers to be Built Here.

Bids for over \$5,000,000 were opened at Washington at the Navy Department, on Tuesday, for the construction of new war-ships. The Union Iron Works of San Francisco, bid \$3,100,000 for armored cruiser No. 2, according to the Government specifications, William Cramp & Son of Philadelphia, bid \$3,150,000 and the Risdon Iron Locomotive Works, San Francisco, \$3,450,000. For the construction of the vessel according to their own plans the Union Iron Works bid \$3,000,000 and the Cramps \$2,985,000.

The big armored cruiser No. 2 is an 8100 ton vessel. She belongs to the class of swift cruisers and is very close to a battle ship in that she is provided with a moderately heavy armor belt, besides a protective deck. Her armor will be about four inches thick and the curved protective deck will be six inches thick. She will be armed with six 8-inch and twelve 4 inch breech-loading rifles. Her engines will develop 16,000 indicated horse-power and a speed of twenty knots an hour. Her dimensions are: Length, 380 feet; extreme breadth, 64 feet 2 1/2 inches; depth in hold, 41 feet 3 inches.

The Secretary of the Navy has referred the plans to the Chief Naval Constructor and Chief Engineer, who will shortly report. It is generally believed that both the vessels will be built by the Union Iron Works in this city. This will be quite a triumph for the Pacific Coast and for the energetic managers of the Union Iron Works.

Retorting and Melting.

(Continued from page 393.)

at the bottom of the pan. As soon as a bar is poured, the discharge spout is stopped with a plug of bone-ash until sufficient bullion has accumulated for another bar. After the first bar has been melted, the succeeding ones can be melted and poured at intervals of about 15 minutes each, bullion and charcoal being piled on top as fast as necessary.

As an actual fact, one man can easily melt six bars, of about 4500 ounces troy each, and have his furnace empty in two hours from lighting the fire.

The advantages of this style of melting over crucibles are obvious, and it has also an advantage over the reverberatory furnace in that the melting is done by a reducing flame instead of an oxidizing one, thus avoiding the loss of silver by oxidation.

Two blast tuyeres pass through the water-hack and the blast is supplied by a Root blower. A blower of suitable capacity and an extra pan-bottom are supplied with each furnace. These furnaces, and also the retorts, are built by the Folton Iron Works of this city.

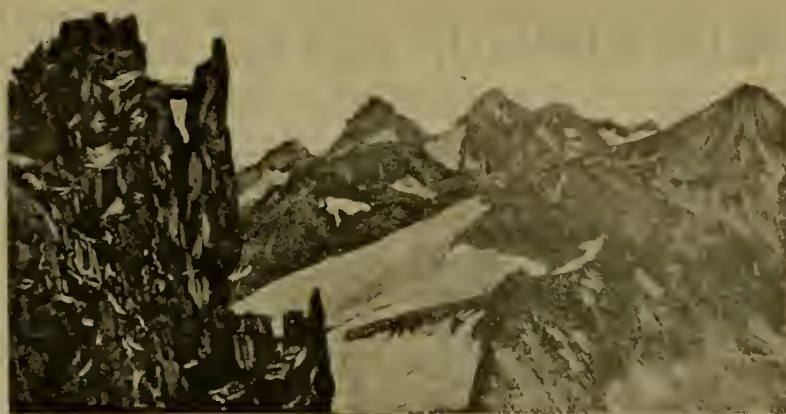
MILLING AT PACHUCA.—E. C. Van Blarcom has resigned his position as superintendent of the Hacienda de San Francisco (quartz-mill) at Pachuca, Mexico. In the future, Mr. Van Blarcom proposes to pay more attention to consulting engineering, making a specialty of milling. From Mr. Van Blarcom we learn that the Hacienda de San Francisco has been quite successful, silver ores carrying only ten ounces per ton being worked to a profit. At Pachuca, coal costs \$19.20 per ton, salt \$48 per ton, and sulphate of copper 10 cents per pound. The success of this mill speaks well for the process—"Boes Continuous"—and also for the ability of Mr. Van Blarcom as a manager and amalgamator. For the present, Mr. Van Blarcom will make his headquarters in Pachuca.

BULLION SHIPPED.—Atx. Wise last week shipped two bars of bullion from the Humboldt reduction works, Nev. This was the first shipment of bullion from the works since 1882, but it is expected that regular shipments will be made henceforth.

In the High Sierra.

During last summer a party of four young men from the University of California, visited the high Sierra on a vacation trip. They have told their experiences in the *Occident*, a college weekly conducted by the students, and from this narrative we make some extracts. They went by steamer to Stockton, and by rail to Milton, where they took stage to the old mining camp of Columbia, near Sonora. The rest of the trip was made on foot, camping out along the road. At the end of a week they reached Lake Eleanor, the first noteworthy place on the trip. There, also, they entered the region of country covered by their map, of which a slight sketch is here presented, to give a general idea of the location of the chief points of interest noticed. The dotted lines indicate the trails followed, and the round dots show some of the principal camps.

Eleanor is one of the larger of the numerous mountain lakes of that region, being some three or four miles long. Like most of the others, it is hemmed in by mountains, except at the lower end, where there is quite an extensive meadow, covered with rich grass and bright



THE "ALPS" LOOKING S. E. FROM MT. LYALL, MT. RITTER IN CENTER.

the two routes to Mt. Dana. Arriving there, the ascent of the mountain was made. This ascent is easy, as there is little danger from dislocated falling rocks, and there is very little real hand-and-foot climbing to be done. Leaving the peak, the party passed on through the

low us. At last we stood on the solid, icy snout of the glacier itself. The whole upper surface was covered with snow, but small rills had cut shallow channels which disclosed the solid ice beneath. It appeared treacherous to the footing, the glare from the surface was truly dazzling, and there was almost a mile of

was some danger of falling into the snow-covered crevices of the ice. But all was accomplished in safety.

Concerning the pinnacle, the Geological Survey report says: "The dominating point was ascended by Brewer and Hoffmann; but they were unable to reach the summit, which was found to be a sharp pinnacle of granite, rising up above the snow at a point estimated to be 150 feet from the top." We found it an extremely hazardous climb. The rock was broken into huge pieces, which did not seem to be very securely bound together. First, we passed up what in common parlance is called a "hog's back." A false rock, falling to the left, would have hurled us along with it to the bottom of the precipice, over a thousand feet below; falling to the right would have trundled us over its sharp fellows down to the Lyell glacier. At times one would cry to our bravest and most adventurous men: "Is that rock safe, D.?" More than once half of us resolved that it was foolhardy to make the attempt, but some new and safer way was always found. Now on the back, now on the stomach, under shelves and around narrow ledges, reaching ahead for a finger-tip hold, pulling the body cautiously up, was the only method of climbing. Sometimes a narrow gully offered the chance to wedge up by a successive expansion of elbows and knees. A slip and all would be over, but we were too careful.

At last we stood on the summit—the first party to make the complete ascent since 1885. The view from Dana is brilliant—that from Lyell is sublime. To the south—behold! 'tis the "Alps of California." Range after range, pinnacle after pinnacle, in absolute confusion. Hundreds of peaks rise into perpetual snow, terrific canyons intervening. Chill orags, serrated and serrate, point their weird fingers to the sky. Glistening glaciers project their dirt-handed snouts into lakes of greenish white. These abound everywhere. Conspicuously they rest upon the brink of granite benches, and seem as pure and divine, almost, as the beamless air about us. And over all dead silence reigns supreme. It was appalling, painful, inanimate—a great relief followed the first utterance of the human voice. Away to the westward Mt. Diablo just appeared through a curtain of smoke, a striking contrast to the heavenly purity of the atmosphere which bathed the peaks about us. The necessity of reaching camp before dark compelled our early departure, but not until we had followed the example of the seven who had already left their names on the summit, did we make the start.

It was 1 P. M. The sun was shining hotly on our heads, the melting snow was freezing our feet. As we hurried rashly along, D., who was in advance as usual, suddenly almost disappeared from sight. We guessed it all—he had fallen through a bridge of snow into a crevasse, the one object he feared in all glacier traveling. A camera was slung over his shoulder, and this probably saved his life. It caught upon one edge of the orag, his left arm rested on the other. He was hanging there as if ploated over the crevasse, which was two or three feet wide, and how deep? A stout etlok was immediately placed under his arms, and he was pulled out in less time than it takes to describe. It was a miraculous escape. We could gaze down between the heyl-like blue walls of ice,



SKETCH MAP SHOWING POINTS OF INTEREST IN SIERRAS.

flowers, and an occasional dense clump of willows. This meadow occupies the left of the view here shown, which is looking up the western shore of the lake from near the outlet.

After a pleasant day here, the young men went on to Hitch-Hitchy, a valley which is

Sierras to Mono Lake, and returned to Soda Springs for provisions, where two more young men joined them. They went on and camped near the foot of Mount Lyell, starting the next morning at 5 o'clock for the summit, anxious to see the "living glacier" they had heard so

much about. We were, however, prepared for every emergency; our shoes were well provided with nails, and a handkerchief tied around the head and hunched a little under the eyes protected them from the glaring light.

Small rills soon began to appear every-



LAKE ELEANOR.

not rich in natural wonders compared with the Yosemite, but still very interesting to visit. The Sugar-Loaf and the Hitch-Hitchy fall, with the attendant cliff, are the most notable features. From here they went to Yosemite valley, where they remained nine days, visiting all the points of interest.

From here they took the lesser frequented of

much about. After much exertion (they say in the narrative):

We found ourselves at the foot of the terminal moraine of the glacier, an elongated curved pile of rocks piled together in a confused heap, some 30 or 40 feet in height. We climbed it with the greatest of care, so as to prevent the insecurely poised rocks from rolling over and crushing those who might be he-



ON THE MOUNT LYALL GLACIER.

where, and level places were already becoming soggy.

We hastened to take advantage of what solidity there was yet remaining to the surface, but before the top was reached, we found the walking extremely laborious. At every step we would sink down from three or four inches to a foot, slide back a little, and then with greater effort, urge ourselves upward over the roughened, hilly surface. Then, too, there

but could see no bottom; probably it extended to the bottom of the glacier, here said to be a hundred feet in thickness. After that we tied ourselves together with a rope, as is seen in the photo-facsimile. Later on, as we were clambering down the moraine, a massive stone was displaced, which came thundering down upon those below, but happily, fate was again averted.

No other accidents occurred during our re-

turn, and excepting for the fact that two of the boys who, having neglected to take the proper precaution to protect their eyes, were partially snow-blinded, we had cause to be thankful to the spirit of the mountains which had guarded our fortunes throughout the day.

Exhibit of Minerals.

The State Board of Trade has decided to add a collection of minerals to the exhibit in "California on Wheels," and also in the rooms of the board. The following letter was this week forwarded to the various affiliated counties:

"We respectfully urge all counties, Chambers of Commerce and local Boards of Trade, having mineral resources in their respective localities, to make an exhibit at the rooms of this board and on 'California on Wheels.'"

It is our wish that this part of the exhibition be as varied and extensive as possible, in order that it may be made one of the prominent features. This is a matter of great importance. California, so rich in mineral wealth, should not be without a representation of the jewels that have made her famous, and still constitute her wonder of the world. Information regarding packages and forwarding cheerfully furnished on application. Respectfully,

A. CAMINETTI,
Secretary State Board of Trade.

The board also contemplates the issuing of a companion book to the "Fruit Industry of California," under the title of the "Mining Industry of California." In order to do so, information is needed as to the mineral resources of every county. A request has been sent to the boards of trade in every county in the State asking for an exhaustive description of the mineral resources of each portion of the State.

These are steps which should have been long since taken and should result in great benefit to the mining industry. It is to be hoped, however, that proper judgment will be exercised in the matter of the pamphlet, so that it will not be too voluminous or too "puffy" and that all our mineral industries will be considered. While our principal mining is for gold, there are 30 or 40 other substances mined for in this State, and in nearly all of them more could be done than is now the case.

There is plenty of available material for such a pamphlet, but its compilation should be entrusted to some one perfectly familiar with the subject and who can exercise suitable judgment as to what to reject. Our mineral resources are sufficiently important to bear investigation, and it is better that no exaggerated statements of any kind should appear. A properly compiled pamphlet would be of great utility, and all branches of mining should receive attention.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

ANTI-CALORIC CO., June 6. Object, to manufacture, use and sell non-conducting materials and substances, and establish warehouses for cold storage purposes in this State. Capital stock, \$500,000. Directors—J. C. Cebrian, Wm. Fores, W. Hanson, Frank McLaughlin H. M. Hanmore, Percy F. Morgan and G. C. Morgan.

GOLDEN GATE LAND CO., June 6. Capital stock, \$1,000,000. Directors—Behrend Joost, John Foley, William A. Dawes, John H. Ryan, Rudolph Mohr, Fabian Joost, Frederick C. Siehe, Henry Geilfuss, W. H. Nolan, P. A. Lux and Otto Fauss.

ALAMEDA M. & M. CO., June 11. Location, California. Capital stock, \$100,000. Directors—J. A. Hall, J. E. Shea, J. T. Landregan, Philip Monroe and W. C. Wright.

ESTRELLA VINEYARD CO., June 11. Capital stock, \$250,000. Directors—S. W. Ferguson, B. Marks, H. C. Campbell, M. F. Hudson and J. H. Barnard.

STANDARD WATCH & DIAMOND CO., June 11. Capital stock, \$50,000. Directors—J. J. Bryan, Leon Carreau, J. H. W. Harris, C. T. Swain and J. O. Scott.

CAPITAL INVESTMENT CO., June 11. Capital stock, \$100,000. Directors—H. P. Sontag, J. N. Knowles, E. R. Lillenthal, Leon Sloss and M. J. Newmark.

ACCUMULATION & INVESTMENT CO., June 11. Capital stock, \$150,000. Directors—C. O. G. Miller, H. M. A. Miller, John Coop, E. C. Hutchinson, J. W. Butler, J. D. McKee and W. J. Morgan.

THE ALASKA MILL & MINING CO. has applied to the Superior Court for a dissolution of the corporation, which was formed Dec. 1, 1861, with a capital of \$10,000,000 in 100,000 shares. The directors are: J. D. Fry, Edgar Mills, E. W. Hopkins S. L. Jones and William Alvord.

PACIFIC IRON WORKS, June 3. Capital stock, \$300,000. Directors—Ira P. Rankin, Willis G. Dodd, John Taylor, John R. Cross and S. O. Putnam.

CHESAPEAKE OYSTER CO., May 28. Object, to engage in the culture and sale of fish and in the canning industry. (Capital stock, \$30,000. Directors—W. S. Stevens, Thos. F. Morrison, C. H. Wood and C. E. Freeman.

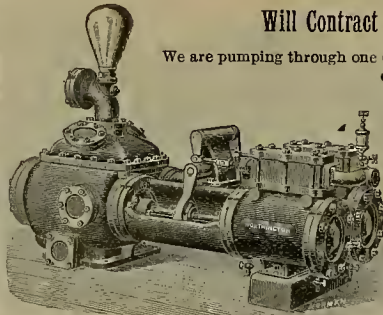
NATIONAL ELECTRIC DEVELOPMENT CO., June 4. Directors—G. A. Davis, J. C. Turner, H. C. Miller, C. D. Cushing and C. J. Fallon.

GOLD AND SILVER EXTRACTION CO., June 4. Directors—Thos. Price, H. A. Powell, Arthur F. Price, H. J. Owen and L. F. Koch.

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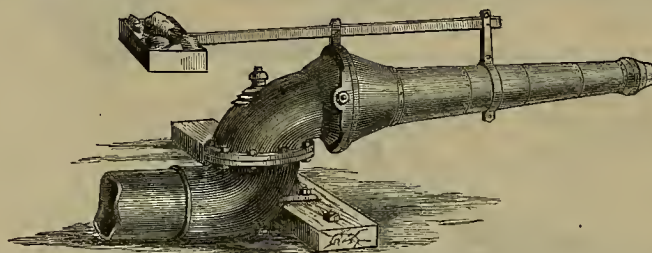
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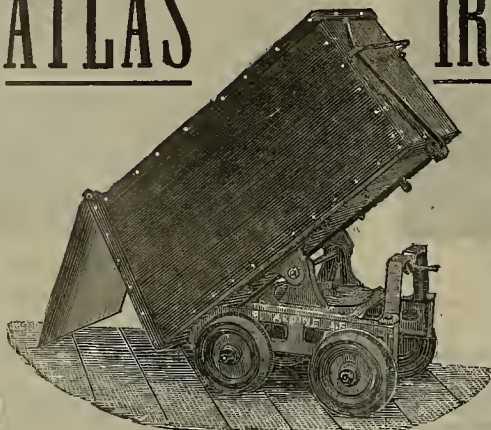
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ALMARIN B. PAUL,

Middle Creek P. O., Shasta County, California.

Coast Industrial Notes.

THE OTAY WATCH FACTORY, San Diego county, turned out its first watch recently.

THE loggers upon Puget sound have, it is estimated, cut and rafted this season about 320,000,000 feet of logs.

LARGE quantities of lumber are being sent by rail from Tacoma to the East at present, in addition to water shipment.

SAVS the Pasadena Star: Los Angeles county sends annually to foreign markets fully \$50,000 for butter and cheese. This is disgracefully wrong. We can and should produce every pound needed for home consumption, but are too lazy to do it.

THE new brick company has bonded a large portion of Carter's ranch, bordering on the water-front of Vallejo, Solano county, and will soon commence operations. The whole country is filled with the finest clay, and this industry promises to surpass all others in that vicinity.

THE Tacoma Mill Co. has out a timber of extraordinary length for a schooner now being built at this port. It is clear lumber 134 feet long, 24 inches wide and 18 inches thick. Two feet were cut from the stick, as it was too long, and it was then 132 feet long and contained 4750 feet of lumber, board measure. This is charged \$100 a thousand, so that the stick will cost the owners of the schooner \$475.

THE Callistote Company has been sold to an English syndicate for \$300,000. This company began in the most humble way. The wonderful article was discovered by Mrs. Emma P. Ellis, on her ranch near Callistote, Napa Co., Cal. She formed a company of women to put it on the market. One of the most remarkable things of this enterprise was the discovery of the great variety of oases to which this article could be put.

ARTHUR BROWN, superintendent of bridges and buildings for the Southern Pacific Co., will again go over the Central Pacific to the Sierra to look after the work of repairs to the snow-sheds which is now going on. This season's repairs to the 40 miles of sheds will cost fully \$250,000. Damaged sections are being rebuilt and timbers are being taken out and replaced to put the sheds in first-class condition for the coming winter.

THE Astorian says: It is reported that a belt of 20,000 acres of timber land in the vicinity of Buck Lake, in the southern part of the State and tributary to the Klamath river, has been sold to a New York syndicate at \$1280 per claim of 160 acres, and that the same syndicate had bonded 80,000 acres of very choice land in the same section for \$12 per acre. A large portion of this timber land was filed on by California parties. Gen. Russell A. Alger is one of this syndicate.

AN apiary on wheels is one of the latest innovations in this State. After the foothills have been pastured, the bee-herder moves his bees to a higher elevation, where the industrious insects gather the nectar stored in the blossoms of wild clover, chaparral, manzanita and other plants, and when these have been relieved of their saccharine matter the bees are again moved to a still higher elevation, where flowers peculiar to the region yield up their sweets to them. Migratory bee-keeping is said to be a success.

At the marble quarry in Inyo county, 30 carloads of marble are now ready for shipment. Different-colored marbles are in the lot, and all of them are very handsome. The new mill on the Truckee river is rapidly approaching completion and in a few weeks will be ready for work. The mill is within such easy reach of San Francisco that dealers and marble-workers need not carry large stocks, but can give their orders at the office of the company in San Francisco and have them filled as promptly as though the marble was kept in stock in the city. The beautiful marbles of this quarry are now so well known that there will be plenty of demand for them as soon as the mill is in operation.

THE North Beach and Mission street-car line will soon be substituted by a cable road at an estimated cost of \$2,000,000 for changes in equipment and construction of road-bed. The system extends from East street to California avenue, at the extreme southern end of Folsom street, and the cross-town route begins at Bay street and passes along Mason to Montgomery avenue, to Broadway, to Dupont, to Pacific, to Kearny, to Geary, to Stockton and to Fourth street, where it terminates at Townsend. This other department of the road extends from East and Market streets, up California to Kearny, where it is to join the line from North Beach. The present line from Montgomery street, down California to Battery, and along First to Folsom, will also be operated. Michael Skelly, superintendent of the road, has stated that the work of construction will begin early in the fall, and once begun will be completed as fast as possible. The equipment will not be surpassed by any other line in the city. The engine-houses are to be located on the corner of Fourth and Louis streets and on the west side of Folsom, between Army street and California avenue.

It is not generally known outside of the trade what a difference exists between the redwood products of the two great sources of supply, Mendocino and Humboldt counties. The latter, owing to its naturally richer soil, which

has stimulated and forced the growing tree to supreme efforts, produces a more porous, softer and coarser-grained wood. It is on that account more easily worked and recommends itself to millmen, who prefer the kind that "rips" up most easily and have nothing to do with the question of possible durability. Its very size, too, brought about as mentioned by the richness of the soil, enables clear boards of greater width to be sawn out of a Humboldt than a Mendocino log—that is, as a rule—and consequently it fetches about \$1 per thousand more in the local market. Some English buyers, on the other hand, prefer Mendocino redwood as a finer timber, while the Australian market, which calls for clear, wide boards principally, is mostly supplied from Humboldt.

MILLER & LUX, the Southern Pacific Company and Philip D. Armour of Chicago are preparing the plans for the erection of a million-dollar slaughter-house, packing-house and cold-storage house combined, which is to be of sufficient size to supply not only the entire Pacific Coast with dressed and packed meat, but is to reach out for business in British Columbia and other countries where there is a prospect for a market. The land east of the present railroad line and south of Hunter's point is largely owned by Miller & Lux, and it is on this tract, near the Fourteen-Mile House, that the packing-house will be constructed, providing the other arrangements are completed. Such a site will afford ready access to rail and water and will be far enough away from the city to preclude any opposition being made. The new company has two separate plans combined in the one great scheme. It is proposed in the first place to supply the coast with fresh meat of all descriptions, drawing cattle and other animals from California, Nevada, Oregon, Idaho, Utah, Colorado, Arizona, New Mexico and Texas. This meat will be dressed here and placed in cold storage, being shipped in lots to suit in a similar manner. This is the basis on which the beef business of the East is carried on, and the new company contemplates the absorption or retirement of all the Butchertown establishments. The second branch of the business will be the packing of beef and pork on the same scale and plan as it is done in the East.

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HARQUA HALL MINES.—A half-interest in the Buarza group of mines in the Harqua Hall district, 110 miles northwest of Phoenix, Arizona, has been sold. The property was owned by Frank Kirkland and Thomas Cochran of Phoenix, who receive \$37,500 for their interests. The new owners of the property are A. G. Hubbard and G. W. Bowers of California and C. H. Gay of Phoenix, who are said to represent heavy capitalists in Denver. The properties consist of seven claims, and are the same about which there was much excitement a year ago at the richness of the croppings.

A GAS EXPLOSION occurred on Sunday in the east crosscut of the 750 foot level of the Chollar mine, on the Comstock, by which Roger Pendergast and Wm. Owen were severely injured. The men employed about the mine are entirely at a loss as to how the gas got into the drift, as it is a new drift with new timbering. The only theory is that there is a crevice from some old drift leading into this one.

THE NORTON-COOK PRATT CO.—This company has established itself in the large store at 221 and 223 Market street. The members of the company have had long experience in handling sawmill and wood-working machinery, and will represent several well known Eastern manufacturers of these specialties. They will furnish estimates of the cost of wood-working plants of any kind on short notice.

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MECHANICS' FAIR.—The gross receipts of the 24 fairs held by the Mechanics' Institute of this city have been \$1,182,496, and the net profit \$147,000.

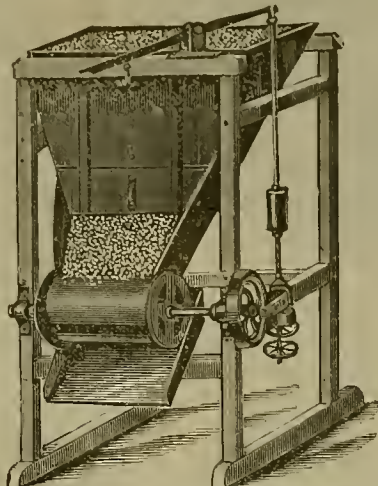
FOR SALE.—AN ONYX MINE IN SAN Bernardino County, only about three miles from Railroad. Down grade from mine to the road. Price, \$5000. NOLAN & SMITH, 34 North Spring Street, Los Angeles, Cal.

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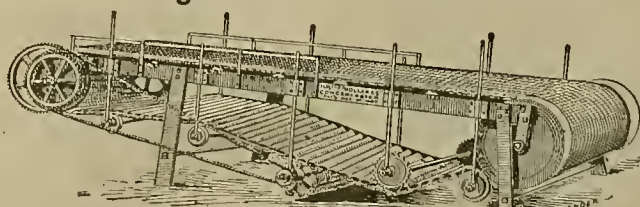
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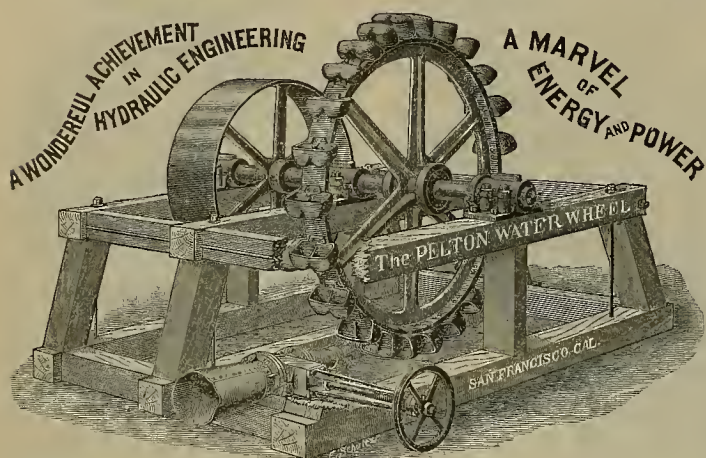
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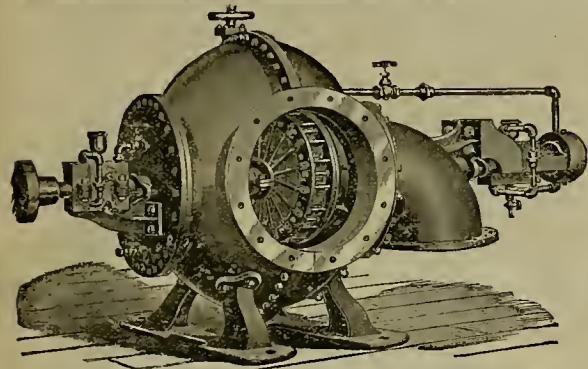
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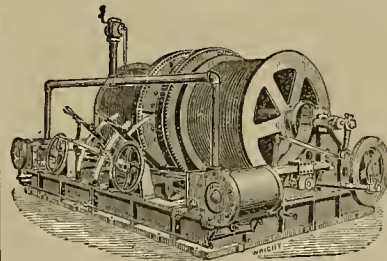
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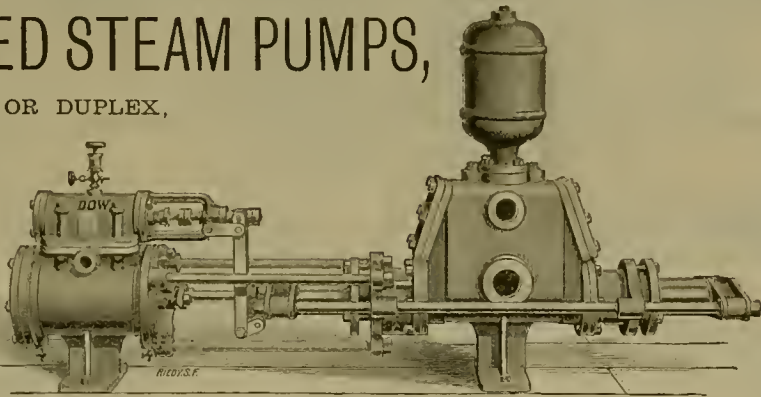
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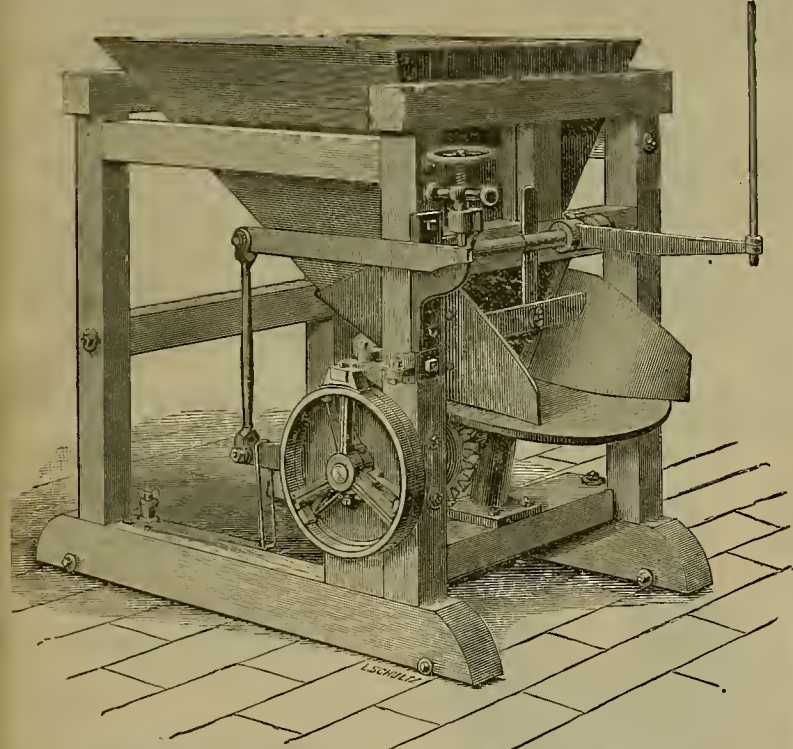


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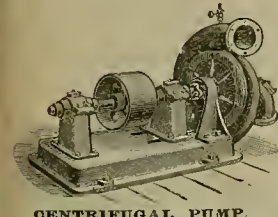
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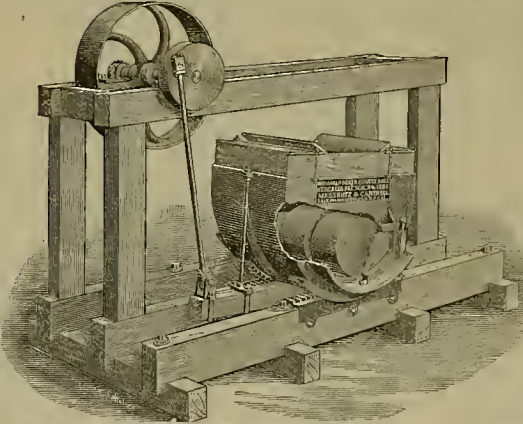
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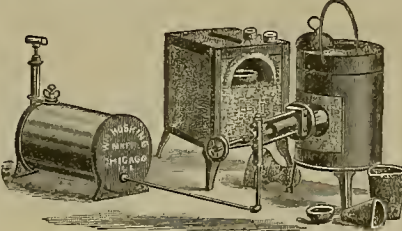
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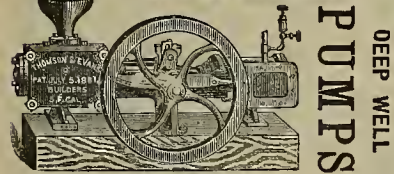
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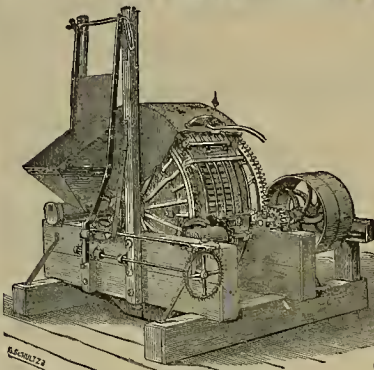
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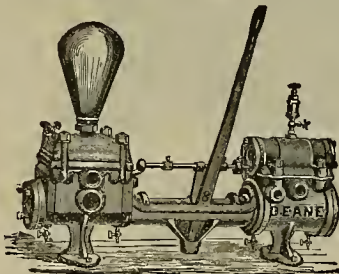
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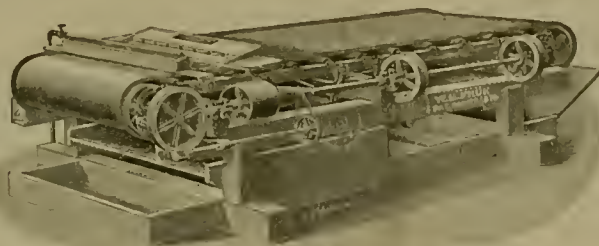
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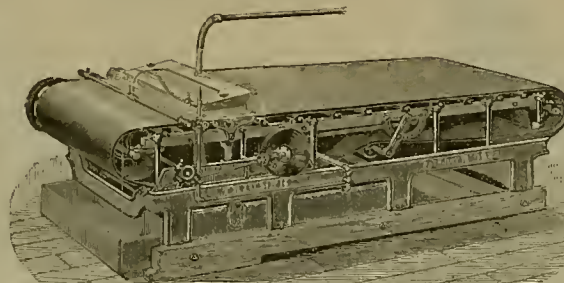
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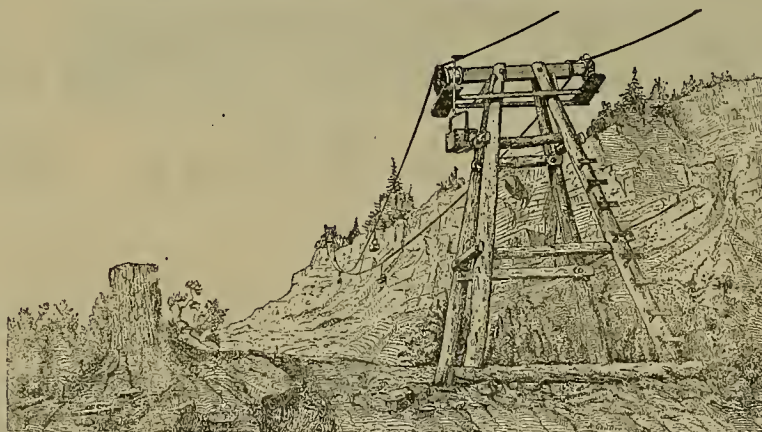
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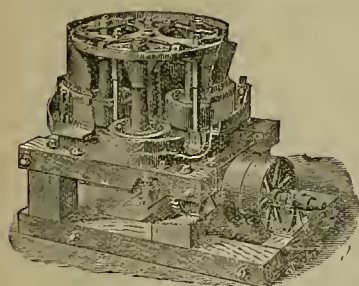
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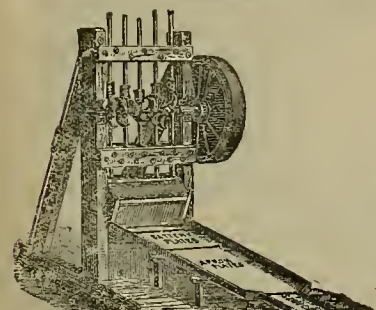
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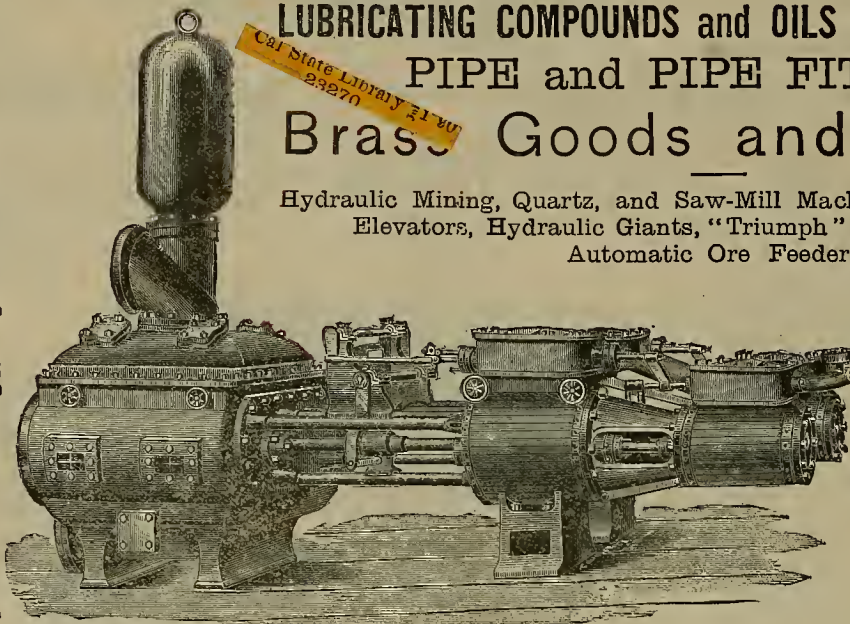
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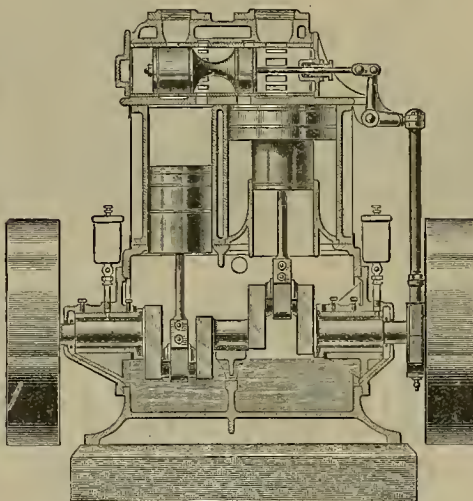
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SAN FRANCISCO, CAL.

MINING AND SCIENTIFIC PRESS.

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A Light and Power Plant.

The Roaring Fork Electric Light & Power Co. of Aspen, Colo., a part of whose plant is shown herewith, affords a very interesting application of water-power to the production of electrical energy and the convenient and profitable use made of it in mining operations. This was one of the first attempts on a scale of any magnitude to operate the various machinery required in mills and mines by electric transmission, and the success that has attended the venture has attracted wide attention.

These works are located near the thriving mining town of Aspen, in the heart of the Rocky Mountain range, a place of some 7000 inhabitants, having an elevation of nearly 8000 feet. The power plant consists of eight 24-inch Pelton wheels, which run 1000 revolutions under a head of 820 feet, with a maximum capacity of 175 h. p. each, aggregating some 1400 h. p. The power developed is made to conform to the requirements of the machinery run by the use of reducing tips, so that only as much water is applied to the wheels as is necessary to run the machinery to which they are attached.

Each wheel runs a separate dynamo, the connection being made by belt direct, without intermediate gearing. Close regulation is afforded by means of deflecting nozzle and hydraulic governor attached to each wheel. Water is brought to the station in a single line of pipe, consisting of 500 feet of 16-inch and 3500 feet of 14-inch, discharging into a receiver, from which short connections are made to each wheel.

The station is running 120 arc lights of 2000 o. p. each; also 2000 16 c. p. incandescent lights, the former being operated by the B'nsh

and the latter by the Westinghouse alternating current machines. These lights are distributed over an area of some four square miles, and are used for lighting the streets of the town, hotels, stores, private residences, etc. They are also used to a considerable extent in the mines, mills and sampling works in the vicinity. The electric-power plant consists at

present of one 60 h. p. and six 20 h. p. Sprague motors, which furnish power to underground pump, hoists, tramways, sampling works, etc., at distances varying from one to two miles from the station.

Some idea of the enormous power of these wheels, running under the conditions noted, may be obtained from the fact that the weight

of the wheels alone is but 90 pounds each, showing, therefore, a capacity of nearly two-horse power for every one pound of weight of material, and including accessories to make plant complete, such as shafting, pulleys, boxes, gate, nozzle, etc., the proportion would be 4½ pounds of material to every horse-power developed. The relative proportion in the best

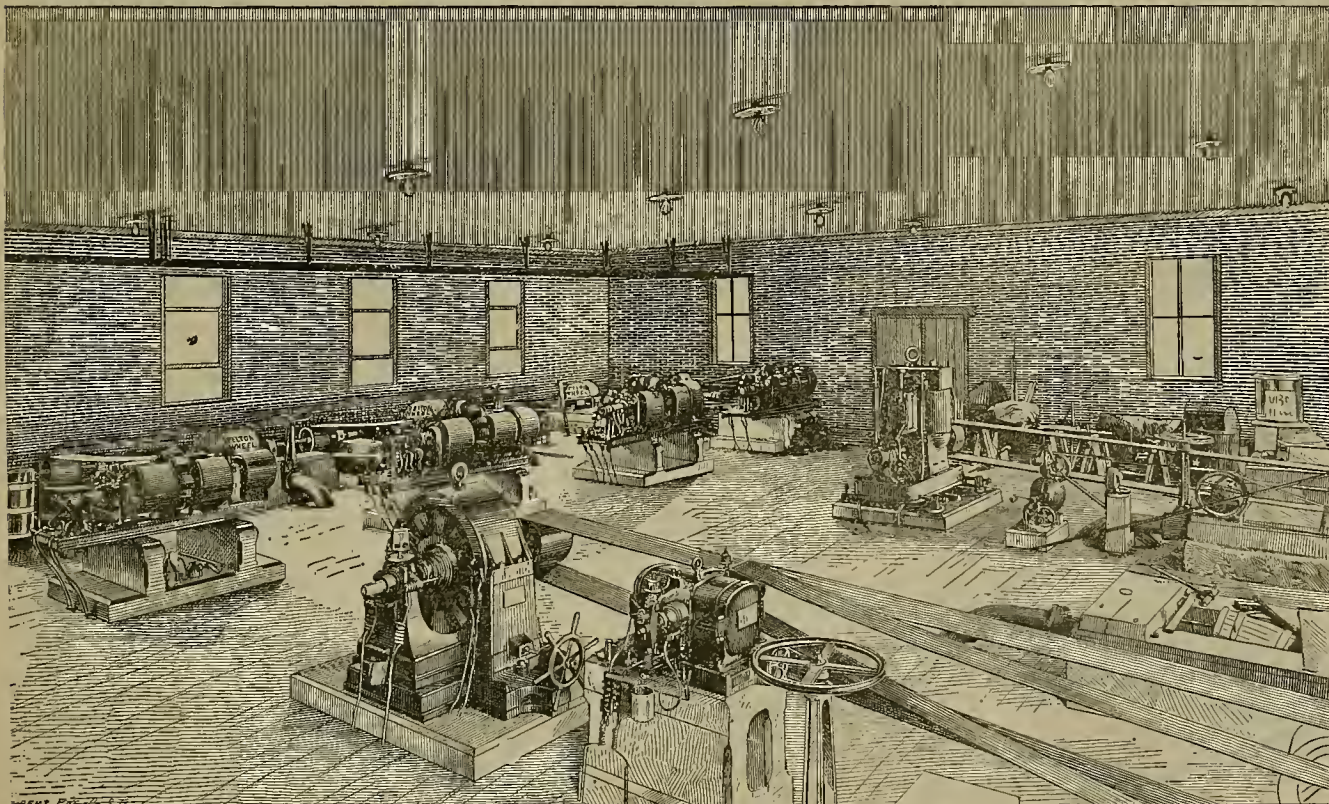
type of steam plants would be from 400 to 500 pounds of material to every horse-power developed.

As regards the reliability of this power equipment, the statement is made that the wheels have worked perfectly without interruption from any cause since they were started. Considering the severe weather encountered at such an altitude during the winter season, this record may be considered as nothing less than remarkable. The statement is also made that no interruption of any moment has occurred in the electrical service, it having given entire satisfaction.

PATENT INFRINGEMENT SUITS.—The Judson Manufacturing Co. has filed a bill in equity in the United States Circuit Court, praying that Barge & Donahoe shall be enjoined from infringing on a patented cultivator and weed-outer. Zan Bros. & Co. have brought a suit of the same nature and in the same court against James Lirng for the infringement of a patented device in brooms.



HAULING A BIG REDWOOD LOG TO THE MILL.—See page 419.



ELECTRIC LIGHT AND POWER PLANT RUNNING EIGHT PELTON WHEELS WITH CAPACITY OF 1400 HORSE-POWER.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

Mines and Mills of Shasta County.

NUMBER V.

[From our Traveling Correspondent.]

The next mill and mine moving southerly, is the "Central," owned by hanker Bliss and Mr. Whitehouse, of New York. This mine has a good record as far as the value of the ore goes, but, from what I learn, has been rather badly handled, in the way of expending the values in shipping large quantities of ore to various parts, instead of working it on the ground. This company have a large mill, a Huntington of the largest pattern, six Frue concentrators—with any amount of silver plates, and yet could not work the ore to a satisfactory per cent, from what cause I could not find out. The mill is run by steam-power and is located on the Sacramento river, and some miles from the mine, which is directly back, hauling being all down-hill. The mine has a fair opening by tunnels, at the same time there is not 200 feet vertical development on the lode. The size of the vein varies from 2½ to 12 feet; the rock carries a good quality of sulphurets, and at times pockets of free gold.

What this property wants is being opened in depth. At the present time there is but little work being done, but Mr. Anthony, the superintendent, expects to enlarge his operating force soon.

What seems so strange to your correspondent, is that in Nevada, Amador and Calaveras counties, where, as a general thing, the lodes are not more than half the size they are in this district, they will not be content until they are down from 300 to 1000 feet, while in this district, they keep skimming along the surface. Here, unless it pays from the start, the lodes have but location work. The history of California is, that the best mines never paid much, until after a depth of from 300 to 1000 feet was reached.

This Old Diggins district bids fair, on greater development, to be a very interesting and valuable section of Shasta county. It is a mineral belt about two miles in width, and how much over ten miles long I cannot say, all full of large and small lodes, some opened fairly, but the greatest number barely touched, and all claimed by people who never do even assessment work.

Gold in the Cascades.

Continuation of the California Mineral Belt.

EDITORS PRESS:—Having spent several weeks in the Cascade range directly east of this place (Seattle), on the Snoqualmie river, prospecting and making geological investigations. I find that section fairly good in mineral. The country has long been neglected on account of the difficulties encountered in prospecting it. The timber is exceedingly dense, the mountains being very heavily timbered, besides the shrubbery, herbs, and, in fact, all manner of vegetation, giving it an "Oregonian" if not an "Amazonian" appearance. It is needless to say the region has not been prospected for the simple reason that other parts of the globe present a more accessible and open field for the prospector's inspection. Here the great fir and cedar forests are indeed dark and dismal. It is hard labor to ascend these mountains, and, owing to the almost exclusive covering of the mountains with drift and soil, it is, as you can imagine, a hard country to prospect. The outcrops being obscured by superficial deposits, it requires skilled workmen to find mines in this section. The mineral-bearing formations are here, however, and good mines have already been found.

The geological formation of the country about the headwaters of the Snoqualmie is granite, gneiss, porphyry and diorite. The writer has observed valuable ledges of gold quartz, prospecting good in free gold, showing the native gold in visible particles, even without crushing and panning. Nor is that all; there are not only rich gold mines here, but also rich veins of silver, copper, lead and iron.

It is my opinion that good placer digging exists in some of the gulches, from the fact that I have obtained shot gold from the rim-rock, not being able to reach the lower bedrock on account of depth and water.

Am confident that in a few years this will be a famous mineral-producing country; the entire region between Mt. Baker and Mt. Rainier is favorable, geologically, for the existence of vast mineral wealth. After having spent 15 years in the Rocky mountains, I pronounce this field vastly superior for profitable mining to the continental divide. Here we have an abundance of wood and water, and the facilities for treating even base ores are second to none.

In conclusion, I predict a spirit of enterprise in the development of these Cascade mines exactly like that in general going on in this State.

The mines are here, and from those rugged mountains, over which the giant sentinel, Mt. Rainier, "looms inspiring" in "silence and awe," there will be untold millions given to the world.

CHAR F. BLACKBURN.

Seattle, Wash.

The Mines of Amador County.

[By Our Own Correspondent.]

Amador's reputation in gold-quartz mining has been established for so many years that it is not necessary at this time to go into a general history of her quartz-mining interests. Instead, I shall confine myself as briefly as possible to the present condition of the mining industry.

Jackson.

The Amador G. M. Co.'s 60 stamp mill is at present idle. The shaft is being put down from the 600 to 700 foot level, and the property put in shape to run. The heavy rains of the past winter flooded the mine and retarded operations. Mr. Darling is superintendent. Ex Senator Wallace of Pennsylvania and English capitalists own the property, which is a low-grade proposition, with plant to work it on an extensive and economical scale.

The Zelle.

Mr. W. F. Deter, superintendent, has been in operation since the "fifties." The No. 1 shaft is now down 1160 feet on the vein, with the shaft No. 2 down to 270 feet. The vein carries an average width of 25 feet, though the main ore-shoot is 40 feet in width and 500 feet long. The ores carry 2½ per cent of sulphurets. The mine is a low-grade proposition. The mill has 40 stamps, crushing 140 tons a day. The power is water and steam; that is, water, with steam auxiliary. In addition, the company has its own chlorination works of three tons a day capacity.

The Kennedy.

The Kennedy, Mr. J. F. Parks superintendent, is in very good ore, and the mine is paying handsomely. The mine is opened by two shafts, distant 600 feet from each other. The main working shaft, No. 1, is now down to 1150 feet. Shaft No. 2 is now down 1050 feet and will be put down to 1350 feet and connected with No. 1. The vein runs from 1 to 15 feet in width. The vein-matter carries 1½ per cent of sulphurets. At this time the quartz is generally reported as going from \$8 to \$13 a ton.

The mill has 40 stamps and 16 frues. Just below the Kennedy mill Mr. Geo. Gates has put in the Gates hydraulic concentrator to re-work the mill's tailings. The plant handles 90 tons every 24 hours. The 16 tables are 12 feet wide and 14 feet long. These tables are floors with a slight pitch covered with ducking, which is put on across the tables and allowed to lap. The tailings are distributed over tables by a series of perforated sluices. When the tailings have passed over the canvas for a given time they are shot off of a single table, and that ore dropped into a sluice, which carries it to an extra table which is used for that purpose above where it discharges, until the table from which it was shot off is cleared, when it feeds on to its regular table. The ore shot off, clear water is turned on, and the canvas allowed to clean itself of sand, when an end hoist is turned up, which carries the discharge into a sluice-mill with a special nozzle, that throws a flat stream of water. The tables are then washed down and when cleaned, the tailings turned on, and the adjoining table cleaned. By this method of washing, the tables are cared for by one man, cleaning a table in 30 seconds. I saw a table which had run one hour and twenty minutes, and when the sand was washed off, the canvas was covered with very fine sulphurets. The concentrates from these tables are re-cleaned in Mr. Gate's "Golden Queen" concentrator, which is a series of boxes, ten inches in width and seven feet in length. On one side of these boxes a metal trough is hung and the ore, flowing down the same, discharges through small perforations. About half-way down the trough, a stream of clear water discharges on to the tables. The table has a side-jar motion, the re-cleaned sulphurets discharging through two small openings to one side and in the floor of the sluice. The plant is the most extensive and complete of any canvas plant in use, and promises to be a success.

Six miles northeast of Jackson is a group of mines that have proved good properties. Among them are:

The Reid and Anskey Mine.

This property was closed by the storms. The owners have now interested outside capital, and the property is worked on a more extensive scale than heretofore. The gold from this mine is very heavy, the vein being both pocket and milling.

The Gardner, in the same vicinity, is arranging to build a 40-stamp mill.

The Kenzie mine is closed for repairs. The Huntingtons will start up as soon as the repairs are completed. The ores of this section run from \$6 to \$10 a ton, with veins from two to ten feet in width.

Sutter Creek.

The Summit mine was worked in the early days, when ores were not counted of value unless they ran very high in value. The property adjoins the old Eureka, and the best authorities in the county consider it an equally good property. The vein has been developed to a depth of 600 feet. The property is not operated at this time.

The Wildman.

The shaft is now down 700 feet. The vein runs from 5 to 30 feet in width. The ore carries 2½ per cent of sulphurets. The mill has 20 stamps and 10 more will be added. Four Tri-

umph and four Frue concentrators elbow each other for supremacy. Six Knight and one Donnelly water-wheels are used. One Knight hydraulic pump lifts the mine seepage from the 700-foot level. A 25-electric light plant illuminates the mill. Rix and Firth air compressor and power drills are used.

A sawmill for framing timbers will now be added. The batteries are of Knight's make. This mine was considered "no good," and was virtually abandoned when Mr. Tregloan, Sr., took it in hand and interested Boston capital in its merits. Under his management it has paid right along, almost all of the present plant being paid for out of the earnings of the mine.

The Mahoney property is owned by Valentine Bros. of S. F. At present it is idle.

The Lincoln mine is being worked under lease by S. P. R. Stewart and brother of the Senator. The mine is opened to a depth of 800 feet. There is a 40-stamp mill on the property, also a good hoist, though out of repair. This mine is considered as good as any in the county, and should be worked to its full capacity, but owing to some trouble among the owners, is now comparatively idle. The Satter Creek is hung up. I will have more to say of Amador mines next week.

E. H. SCHAEFFLE.

The Hart & Fleming Mine.

EDITORS PRESS:—I see in article No. 4 on "Mines and Mills of Shasta Co.," your correspondent says Hart & Fleming ore carries 1 per cent sulphurets. The average of the whole mine is 5½ per cent. The low-grade ore mill and concentrate carries 2½ per cent, or we save 2½ per cent concentrates, and they net us \$200 to \$250 per ton. This clear of working charges and freight. Ore we ship nets over \$100 per ton. Your correspondent says the lode is opened by several tunnels, the upper ones, however, being about worked out. No. 1 tunnel has a 3 foot ledge of good pay ore in the face, and a very small portion of the ground stoped out. The month of the tunnel is closed by a slide from the mountain, which came down during last winter, and we have not opened it since, but propose to do so soon. No. 1 is 330-foot level; No. 2 is 410 foot level. We have stoped considerable ore, but only a small portion of the amount developed. No. 3 tunnel is over our 530-foot level, and connected by winzes and upraises with Nos. 1 and 2, and is 700 feet long, and 300 feet of this in good ore, and a 3 foot ledge high-grade ore in face now, 2-foot gänge alongside on foot-wall.

Your correspondent says, one remarkable feature connected with this property is that it belongs to two preachers. He was misinformed, although one, Mr. Fleming, is a local preacher in the M. E. South Church. The original locator of the mine, Mr. Hart, is a miner and has been all his life, or since able to do anything, and has managed mines and mills for 30 years in different parts of the world. While he has not the honor of being a preacher, he is a layman in the M. E. Church and knows that mining business can be run, and successfully, without swearing.

In conclusion, we find our present method of working to be the most profitable to us. A smelter or to dry crush and chlorination on the ground would be the most profitable. We are now driving a No. 4 tunnel in 250 feet. When we strike pay and good ore in this, we will turn our attention to working the ore for permanent business. Hope you will pardon us for troubling you, we wanted you to have the facts, but don't care to advertise our business or appear in print.

HART & FLEMING.

Redding, Shasta Co.

THE El Dorado county slate quarries are increasing their output. An essential characteristic of good slate is plane of cleavage. It is of record that a piece of slate from El Dorado county one inch in thickness was split into more than 30 layers. The only quarries now being worked in are those of Calli Bar, 2½ miles from Placerville, on the road to Georgetown; the American river runs through the ground. Samples of this slate have been placed in the Mining Bureau and expert pronounce it of fine quality. The slate deposit, so far as can be determined by surface indications and openings actually made, is a large one. The qualities of the slate are the desirable ones of tenacity, elasticity, moderate hardness, and perfect cleavage. Another quarry was opened on this property in May, 1889, from which roofing slate in considerable quantity is being taken. The new California theater in San Francisco is roofed with slate from these quarries, and many contractors for new buildings in this city and other cities in different parts of the State have accepted the material for the same purpose. Slate quarrying is a comparatively new industry in California, but as the El Dorado article appears to be coming into general use, it is safe to predict that in time it will be an important one.

THERE is considerable excitement here over new finds of gold in Swank creek, near Elensburgh, Washington, one party taking out as high as \$60 a day.

THE United Verde Copper Mining Co. of Arizona has declared a dividend of 10 cents per share, or \$30 000. This is the first dividend since April, 1886.

The Gold Belt of Northern California.

Ancient River Channels and Gravel Deposits.

NUMBER II.

[Written for the MINING AND SCIENTIFIC PRESS by JAMES F. TALBOT, Shady Run, Placer Co.]

Mr. Amos Bowman, who was actively engaged in the geological survey of the State, and is scientific authority on the subject, wrote an article several years ago on the "Pliocene Rivers of California." He accounts for the changes from a scientific standpoint. He says: "The hundred transient volcanoes of the Sierra Nevada, associating themselves with things beyond, flamed up for a period and marked the end of an epoch."

He divides the successive changes into corresponding periods of time:

1st. The Pliocene or ancient eroding period which continued uniform for many thousands of years, and the gravel making era followed in succession and lasted thousands of years more before the present canyons began.

2d. The Pliocene filling of the canyons and rivers with gravel, or the choking and damming period.

3d. The volcanic period of the Sierras, when the gravel was capped with lava.

4th. The cold or glacial period.

5th. The modern eroding period, when the present canyons were cut out.

In regard to the first period, it is evident those canyons were cut out and the gravel and gold deposited in them prior to the volcanic period. Geologists have established a period of time when those ancient rivers existed, and, as we may suppose, drained the western slope of the Sierras and deposited the gravel and gold in the same way as the present rivers, although on a much larger scale and from the primitive source.

It is a self evident fact that this period ended when a succeeding one commenced. Existing conditions and development of facts indicate beyond a doubt that the succeeding period was the volcanic, and that all the changes referred to by Mr. Bowman are accounted for during this one period, except "the cold or glacial period," which, with due deference, I ignore altogether. Facts will be adduced hereafter to establish conclusively the co-existence of the "Volcanic, the choking or damming, and the modern eroding periods" of Mr. Bowman.

The "Progressive Theory"

Is based upon the views here expressed. In this connection, I will notice two conditions that have an important bearing on the modern erosions—grades, and a change of level. Geologists account for these changed conditions by uplift and subsidence. It must be evident that a change of level has taken place, or the present rivers and canyons could not be lower than the ancient ones. The geological ideas of the instability of the relations of land and sea may account for this change of level in this instance, by the uplift of the Coast Range, and concurrent subsidence of what is now the Sacramento and San Joaquin valleys, wherein the Pliocene gravels have sunk from 500 to 1000 feet.

Whatever the cause may have been, the fact remains. In regard to grades, in my opinion there has been no uplift of the Sierra Nevada that would perceptibly affect the grades of the Pliocene rivers within the gold belt since the golden gravels were deposited in their channels.

Abstract theorizing on this subject is to the miner like a well-defined channel filled with nice-looking gravel and no gold in it. What most concerns the miners of the day are facts that point with a degree of certainty to the existence, extent and direction of those ancient river-channels, on which, in connection with quartz, mining in the future depends. To illustrate this progressive theory in detail, I will select all of the well-known section of country, within the gold belt, lying between the Middle Fork of the American river and the South Yuba river. This selection is made for a purpose; that is, the topography and developed facts show that there are two separate and independent ancient channels within these limits, and that there is no direct connection, at any point, between them, and that from each one of those channels a system of gravel deposits has been formed as separate and distinct as the channels themselves.

The section of country between the Middle and North forks of American river contains one of those channels, and will be termed

The Middle Fork Divide

That portion between the North fork of American and South Yuba rivers. The others will be called the North Fork divide.

The country embraced in what is termed the Middle Fork divide is too widely known for its developments, workings and rich mines to require any notice now, but for comparison with the North Fork divide and for the purpose of showing that all of the conditions, developments and facts are in perfect harmony in every detail with the theory here advanced. In making a practical application of this theory to the Middle Fork divide, the first inquiry will be, what conditions are observed that determine the existence, the extent and direction of an ancient channel in this divide?

It will be noted here that the divide is sep-

arated into two prominent ridges by Shirt-tail canyon—Forest Hill ridge on the south and Iowa Hill ridge on the north. Running up the divide, the two ridges come together above the brimstone plains, about south from Damascus.

The fact of the existence of an extensive and rich channel in the Forest Hill ridge is so well established by actual workings that I presume no miner has a doubt on the subject. The conditions observed here are a deposit of bowlders and gravel on the bottom containing the rich pay above this cement pipe clay, and in places thick strata of small gravel, with but little or no fine gold in it; and over all, a heavy lava cap, from 100 to 500 feet thick, all inclosed within walls of hedrock. That these conditions are observed to exist along this divide for 25 miles or more is demonstrated to a certainty by deep shafts and long tunnels inside the rim rock from Spring Garden to near the Secret house, which determines the extent of this channel.

Where the bottom deposits are concealed within the hedrock walls, the lava cap inside the rim is the guide to determine the course. [In this description the points of compass are not strictly observed.] On the south side of the divide, along the head branches of Secret Black and Eldorado canyons, and down the Middle Fork below Spring Garden is a high rim of hedrock, except at points where the present canyons and modern channels have cut it away.

It is obvious, from the character of much of the material at those points, that it could not have been deposited in the present form and condition, only inside of walls of hedrock.

On The North Side of the Divide.

Opposite the head of Secret Canyon, on the south branch of the north fork of American, is a high rim of hed-rock that extends along the river bluffs and Humbug canyon, down to Damascus. Leaving the Iowa Hill ridge out for the present, and passing to the southward, a short distance below Damascus, you come to the Brimstone Plains, a high bed-rock country that separates the two great ridges. Shirt-tail canyon, takes its source in this high bed-rock country, and runs in high bed-rock on a south-west course to its junction with the North Fork, below Yankee Jim's.

There are no gravel deposits on this side of the divide. A slight break in the rim at Damascus above, and where Brushy and Devil's canyons cut through below, are the only outlets for gold from the hills on this side. Having traced the rim-rock on each side, without reference to the course from one point to another, it remains now to determine the course of the channel inside these rims, which is done approximately by following the course of the main lava flow or capping. It is an axiom that figures won't lie. In the N. E. Cor. of Town, 15 N., R. 12 E., Mt. Diablo Mer., between the head of Secret canyon and the south branch of the North Fork of American river, is observed a heavy deposit or capping of lava at an altitude of 5400 feet, and about one mile wide from rim to rim. This main lava flow or capping can be traced on a continuous course within the line of rim-rock heretofore described through the Townships of 15 N., 11 E., 14 N., 11 E., 14 N., 10 E., where, near the center of the western line of 13 N., 10 E., below Spring Garden (altitude 2500 feet), the lava channel and everything has been carried away by the present Middle Fork. By looking over a map of this country it will be perceived that this is nearly a due southwest course from starting-point and near 3000 feet lower.

The Gray Eagle Co.'s shaft at Spring Garden, now 300 feet deep inside the bedrock walls; the deep workings of the Mayflower Co.; the long tunnels through the rim at Damascus, Red Point and the Golden Fleecy; the deep shafts at the head of Black canyon; the Hazard on Volcano, and the long tunnels through the rim back into the rich gravel underlying the lava cap at Sunny South; the Breese & Wheeler claim at Bath, and the Dardanelles, with many others down to Todd's valley, demonstrate to a certainty the existence and extent of the channel and the course of the main lava flow here indicated—demonstrates with an equal degree of certainty the course of this channel through the gold belt on the Middle Fork Divide.

(To be Continued)

It is proposed to build large iron and steel reducing works at Kirkland, a suburb of Seattle, on the shores of Lake Washington. The company when formed will be known as the Oso Bay Iron Co., and will have a capital of \$1,000,000. Among those at the head of the great enterprise are: Gen. Russell A. Alger of Michigan; Peter Kirk, a member of Kirk Bros' great English iron establishment; D. L. S. Hunt, Bailey Galzer, Edward Bewett, Jacob Farth and other prominent capitalists. Mr. Kirk is now in the East getting machinery, and it is expected that the complete plant will be upon the ground within six months. The establishment of this plant means the development of the Squakmie and other iron mines in the State of Washington.

The Paris ring, at the time of its collapse, had 170,000 tons of copper. Now it has 60,000 tons, and prices are steadily advancing. The consumption, it is said, is exceeding the supply. The increased use of sulphate of copper, and the growing quantity used for electrical purposes and cartridges, have largely tended to bring about this state of affairs.

Water on the Pacific Coast.

Contamination in Storage Reservoirs and the Palliative Resorted to.

[The following paper was read recently before the American Water Works Association, by L. J. Le Conte, C. E., of Oakland. In this number of the PRESS we publish half of the article, and in the next number will give the remainder with drawings of the screens and appliances for purifying the water. —EDS. PRESS.]

Climatic Conditions.

The annual contamination of municipal water supplies, depending solely upon the catchment and storage of surface water, is a subject which naturally attracts more and more attention each year.

The experience gained on the Pacific Coast during the past 25 years is particularly instructive from an engineering point of view, in that the physical conditions, which tend to bring about deleterious changes in the quality of the ponded waters, are presented in their most exaggerated form. For this reason more than others the progressive change, which takes place from time to time, are naturally much more pronounced, and therefore more easily observed and studied. In order to be as brief as possible, consistent with clearness, I will confine my attention to the water supplies of San Francisco and Oakland, since they are truly characteristic.

In the first place, as to the climatic conditions. A very marked difference exists between the climate of the Pacific Coast and that of the Atlantic Slope in regard to the rainy season. In the former, the rain each year is usually delivered between November and May, soon after which time the streams generally become dry. The most favorable years give no water supply for half, or nearly half, the year, while a dry year gives no supply whatever, so that it may happen that no surface waters enter the storage reservoirs from March or April of one year to November or December of the next year, an interval of 600 days. The case may be even more unfavorable, due to a succession of three or four winters of small rainfall.

The engineer should not feel safe unless he has storage capacity for 900 days' supply. This fact compels the construction of very much larger storage reservoirs than would be necessary in other countries, in order to make allowance for the extreme features of the climate. As a final result, the works have to be planned so as to practically catch all the storm waters, and nothing is allowed to run to waste.

As to the quality of the water. Here again the natural difficulties are still further aggravated by the dry season occurring during the summer months, when the weather is very warm. This fact leads to extraordinary deterioration in the quality of the ponded waters, more particularly when the water level in the reservoirs gets to be very low. The regular cycle of changes through which they pass, year after year, is of great interest to the engineer, and is full of instruction.

I will next give a brief description of the water supplies being considered.

San Francisco Water Supply.

The city of San Francisco derives its chief supply of water from three large artificial storage reservoirs located in the Coast Range of mountains, and are known as the "Pilaritos," "San Andreas" and "Crystal Springs."

Pilaritos Reservoir.

This supplies the high-service system, and was built in 1864. Its capacity is 1,080,000,000 gallons above the dead-water line. Area of water surface, 115 acres; elevation 696 feet above high tide. Dam is earthwork, 95 feet high by 650 feet long. Depth of water at dam, when full, 85 feet. Direct watershed six square miles, and is all mountainous. Average annual rainfall, 50 inches. This reservoir is connected with the city by an aqueduct consisting of three tunnels, lined with brick and cement, having an aggregate length of 7870 feet; also 8300 feet of wooden flume and 69,336 feet of 30-inch wrought-iron pipe. This brings the water to Laguna Honda service reservoir, capacity 33,000,000 gallons at an elevation of 377 feet above high tide. Just before entering the reservoir, the water passes into the screen-house, where it is made to strain through a system of cloth screens, which will be explained in detail further on. The screened water passes from the screen-house into the service reservoir above mentioned. From here a 22-inch pipe delivers the water to the highest part of the city in the Western Addition.

San Andreas Reservoir.

This supplies the middle-service system, and was built in 1867. Its capacity is 6,690,000,000 gallons above the dead water line. Area of water surface, 525 acres. Elevation, 450 feet above high tide. Direct watershed, 41 square miles, and indirect watershed, drained by feeders, three square miles, and is all mountainous. Annual rainfall, 40 inches. Dam is earthwork, 93 feet high by 640 feet long. Depth of water near dam, when full, 89 feet. This reservoir is connected with the city by an aqueduct consisting of 3070 feet of tunnel lined with brick and cement, and 64,000 feet of 30-inch wrought-iron pipe leading into College Hill service reservoir, which is 253 feet above high tide, and has a capacity of 14,000,000 gallons. This reservoir also has a screen-house and system of cloth screens similar to that at Laguna Honda, and the water from the storage reservoir is always screened just before its entrance into the service reservoir. The San Andreas reser-

voir holds all drainage waters, and nothing goes to waste in the wet season. It never has been filled but once. The Pilaritos and San Andreas conjointly deliver to the city an average of 9,000,000 gallons per day, derived from 12½ to 13 square miles of drainage area.

Crystal Springs Reservoir.

This supplies the low-service system, and was built in 1877. Its capacity is 3,830,000,000 gallons above the dead-water line. Annual rainfall, 30 inches. The water service, 500 acres. Elevation, 268 feet above high tide. Direct watershed, 15 square miles, and is mountainous. Dam is earthwork, 50 feet high by 340 feet long. Depth of water at dam, when full, 46 feet. This reservoir is connected with the city by an aqueduct consisting of 8000 feet of wooden flume, 9000 feet of tunnel and 16.92 miles of 44-inch wrought-iron pipe. This brings the water to the University Mound service reservoir, having an elevation above high tide of 169 feet. Here again the water passes to the screen-house, where it is made to strain through cloth screens before entering the service reservoir. The Crystal Springs reservoir catches all the storm water, and nothing is allowed to run to waste. The aqueduct supplies on an average 22,000,000 gallons per day.

Oakland Water Supply.

The city of Oakland derives its water supply from two storage reservoirs constructed on the adjoining foothills and known as the San Leandro Reservoir and the Temescal Reservoir. The latter is quite insignificant, and the chief supply is taken from the former, which we will now describe.

San Leandro Reservoir.

This reservoir was built in 1875. Its capacity, 4,300,000,000 gallons above the dead water line. The water surface, 410 acres and has an elevation of 225 feet above high tide. The watershed, 40 square miles and is mountainous. The dam is earthwork and 100 feet high by 450 feet long. Depth of water at dam, when full, 90 feet. The water on leaving the lake passes through the ordinary fish screen and then enters a double line of 24-inch wrought iron pipe, but flows only a short distance before reaching the screen-house, where the water is made to pass through cloth screens, to be described further on. The screened water falls into a clean water basin. There are two of these basins, 800,000 and 2,000,000 gallons respectively. They are not covered. The water leaves these basins to enter into a large 37½ inch supply main leading to the city of Oakland, a distance of nine to ten miles. On arriving in the city the water is delivered to consumers direct, no local service reservoirs being employed.

The above gives a fair idea of the main features connected with these several reservoirs. It is well to mention that all of them are more or less stocked with fish, principally California and Eastern trout, also black bass, catfish, carp and white fish from Lake Michigan.

General History of the Annual Trouble Affecting the Quality of the Pond Water.

The writer has devoted much attention to this subject during the past five years, and has made many experimental observations and tests. I shall only mention those which have been carefully verified. I will begin my statement of facts in regard to the cycle of changes, which takes place year after year, by commencing in the winter, thence to the spring, summer, and finally to winter again.

Troubles in the Reservoirs.

Ordinarily in the winter and spring months, which is also the wet season, the quality of the water in the storage reservoirs is comparatively good, the temperature averaging, surface water 48° and bottom 50° Fahrenheit, the only objectionable feature being periodical turbidity due to fine loamy sediment, which is brought in by tributary streams. As soon as the stormy weather is over, the water rapidly becomes clarified by natural subsidence, the time required to complete this operation being generally two to three weeks. In the case of the San Francisco water supply, this difficulty is obviated by shifting the supply to some other source less affected. In the case of Oakland this is not practicable, since both the reservoirs are equally turbid about the same time, and as a result the muddy water goes into the pipe system and direct to consumers.

The Fermentation Stage.

As the season advances, the rains cease and the streams run dry. About the 1st of May of each year, the surface water in the reservoirs have acquired a temperature of 62° Fahrenheit, and the bottom water, say 50° Fahrenheit; all vertical circulation has stopped and the period of stagnation begins. Water fleas and some vegetable matter, mostly phytoplanktonic plants, begin to show themselves to a limited extent in shallow water along the margin of the reservoirs, but not in sufficient quantity to amount to anything. As time progresses and the waters get warmer, the next change observed is a chemical one, that is to say, bubbles of carbonic acid gas and light carburetted hydrogen rise up from the bottom to the surface, the temperature of the bottom water gradually rises, and in course of time attains the same temperature as the surface, say 65° Fahrenheit.

It will be as well, perhaps, to mention here that the true cause of this change has been traced conclusively to the fermentation of the immense deposits of mud covering the entire bottom of these reservoirs, averaging ten feet

in depth. This bed of mud, of course, has been many years in accumulating. Repeated examinations show that it is composed of animal and vegetable matter in all stages of decomposition.

The True Cause of Rank Vegetable Growths.

Now then, as a result of this fermentation, the waters of the reservoirs become highly charged with carbonic acid gas, and are robbed of free oxygen as well. Now what do we observe to be the next characteristic feature? Just precisely what might be expected; namely, a sudden and wonderful development of vegetable life, followed almost simultaneously by an equally wonderful development of animal life, principally in the form of water fleas. This vegetable life seems to belong mostly to the variety of cryptogamous plants known as algae. Later on when they reach maturity they break up and develop millions upon millions of tiny green spores, which eventually permeate the whole mass of the ponded waters, imparting to them a beautiful green hue. When these conditions obtain, the spores become a source of great annoyance. They readily pass through the screening apparatus and enter the pipe system in which they die and decompose, thus injuring the quality of the water delivered to consumers. It is well, perhaps, to mention here that these two items of contamination, vegetable and animal life, at first do no harm whatever to the quality of the water, while they are healthy; on the contrary, their presence in such prodigious quantities is nothing more than nature's endless effort to purify water, which has been previously injured in quality, and, furthermore, they would most certainly continue to perform this useful function in nature but for the advent of the next stage in contamination—we will call it the "Fatal Stage"—and which is most disastrous in its results by giving rise to pernicious conditions, which lead to their death and subsequent decay, all of which is utterly ruinous to the quality of the ponded waters. The main characteristic feature of the fermentation stage above mentioned is the fact that the gases developed give rise to no offensive odors of any kind.

The Fatal Stage, or Putrefactive Stage.

The next change noted in the reservoir is also a chemical one; namely, the fermentation of the bottom mud increases in activity, and in course of time becomes converted into putrefactive fermentation. This stage is at once detected by the change in the quality of the evolved gases rising from the bottom, which now become very offensive. Examination shows them to be carburetted hydrogen, carbonic acid, sulphuretted hydrogen. By this process the water in the reservoir soon becomes robbed of nearly all its free oxygen, as instanced by the fish at all times swimming at and near the surface, and becoming very languid in their movements.

During the first portion of this putrefactive stage it was observed that the algae and animal life were both doing their utmost to purify the water, but as this stage advances the fatal by-products of putrefaction, certainly sulphuretted hydrogen, and possibly septic poisons, begin to gain the upper hand, and finally the conditions become so bad that they give up the battle, break up and die and decay in large quantities.

This melancholy condition is called to your attention by masses of dead algae forming great reddish-brown blotches here and there on the water surface, mostly where the gases bubble up in abundance. These blotches soon sink to the bottom, thus adding new fuel to the putrefying matter in the bed of the reservoir. The above lamentable state of affairs exists to a greater or less degree during the months of August, September and October of each year, when the water is at the low stage, and at such times the quality of the water in the storage reservoirs is something almost incredible.

As the season advances, the first change for the better is noticed about the last of October or first of November, when frosty nights set in, and the surface waters become chilled and sink to the bottom, thus giving rise to vertical circulation, which cools the entire body of water, and thus greatly checks putrefactive fermentation, and as a result the offensive odors are greatly reduced.

Chemical analysis made at the beginning of this vertical circulation shows that the quality of the water is actually worse than at any other time during the year. This fact is undoubtedly due to the filthy bottom waters coming up and mixing with the surface water, thus spoiling the supply to consumers, which, you may say, is always taken from at or near the surface.

But no decided relief from bad water is experienced until the rainfall begins, generally in November, when the reservoir becomes filled up again with a fresh supply of cool surface waters, and the temperature is reduced to 55° Fahr. This fresh supply of rain-water is always turbid. There are one or two very important facts connected with these storage reservoirs, upon which I should lay great stress, namely, the San Francisco and Oakland storage reservoirs are equally bad as to quality in midsummer. On the contrary, there exists a very marked difference in the quality of the water as delivered to consumers in the two cities, and this important fact seems to be due unquestionably to the treatment which the water undergoes after it leaves the lakes. This naturally leads us to the next subject.

(To be Continued)

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

NORTH STAR.—*Ledger*, June 14: The following statement of receipts and expenditures for the past year ending June 1st was presented to the annual meeting held last week:

Balance on hand as per last annual report.....	\$ 1158 99
Six assessments, 13 to 18 inclusive, at \$2000 each.....	12,000 00
Total.....	\$13,158 99
Expenses.....	
Construction.....	\$ 341 66
Labor.....	9,018 50
Mine supplies.....	458 68
Timbers.....	149 50
Water-power.....	728 00
Lumber.....	46 54
Powder, etc.....	713 55
Real estate.....	202 29
Incidental.....	176 87
Total.....	\$11,735 59

Balance on hand June 1st..... 1,423 40
Average monthly expenses..... 977 96

The shaft was sunk 207 feet, with 557 feet of drifts and crosscuts, at an average cost of \$15.50 per foot. The total sinking is 922 feet. All developments so far show indications that the mine would prove better at greater depth, so the directors of the corporation decided to suspend all explorations at the 600 and 800 foot levels and sink to 1000 feet and there make a thorough prospect, which, judging by other developments along the mother lode, promised to secure success, having an agreement with the original owners of the North Star mine for an extension for one year on first payment as per agreement, April 1, 1889. The assessments have all been paid without any being delinquent.

MCKENZIE.—McKenzie Bros. have sold their mine near Irish Town to the company represented by Robert Stevenson. We have not heard the price agreed upon, but understand that the money is to be paid in monthly installments, the purchasers first paying off all indebtedness against the property. A ten-stamp mill is to be erected, and thus equipped there is every reason to think that this mine would soon get on a paying basis. The sale also includes the Ratto ranch.

MISCELLANEOUS.—C. Lavezzo made a cleanup of his mill near Pine Grove and realized between \$600 and \$700. The mill of the Amador gold mine is kept running to about one-half its full capacity. The track will need considerable alterations before it can be made to run easily. It takes several men attending to the cars instead of being self-operating as intended. At a meeting of the directors of the Alpi M. Co. held Tuesday last, it was decided to divide the small sum on hand pro rata among the stockholders and wind up the company's affairs. The Cosmopolitan mill is running on rock from the Drytown Consolidated mine. Parties who ought to know say the plates are looking quite as well as could be expected, and indicate a yield of from \$3 to \$4 per ton in free gold.

SETTER CREEK.—Cor. Amador *Ledger*, June 14: Mining has taken another upward step. Since my last, encouraging reports are in circulation that the claim a short distance up the creek, known as the old Rose mine, is to be started up by Messrs. Hayward & Hobart, after 22 years of inactivity. L. R. Poundstone, who is interested in the property, has been here during the past week, and it is understood he will have the management. The old shaft, 100 feet deep, sunk on the ledge, is to be cleaned out, enlarged, and made perpendicular. Sinking to be prosecuted until a depth of 300 or 400 feet has been attained. Mr. Poundstone worked the mine in early days, and says there is an abundance of \$4 rock, which with modern facilities will pay handsomely. Operations will commence as soon as timbers for the shaft can be procured, which will probably be in a few days. F. A. Howard is to the fore with a water-wheel, which is the old Donnelly wheel considerably changed. The buckets and wheel constitute one casting. The buckets are small, intended for high pressure. A test is to be made of this wheel at the Utica mine, Calaveras county, which is expected to develop the superior merits of the invention.

ACCIDENT AT THE LAMBING MINE.—*Dispatch*, June 14: About 7 30 P. M. or shortly after the night shift, consisting of Robt. Jones lever tender, M. Coombs engineer, and John Loskill, commenced work, quite a serious accident occurred at the Lambing mine about three miles from Ione, which might have ended fatally. The back guy of the derrick (which is wire cable) parted just as a bucket of gravel was being hoisted, causing the 110-foot boom and pilot-house to fall to the ground. Jones, who did duty in the pilot-house, which had a 40-foot fall, fell from his position when within a few feet of the ground and miraculously escaped being crushed to a pulp; as it was he escaped with a slight fracture of the skull above the temple, a badly injured shoulder and several bruises. Coombs, who was in the engine-room at the back underneath the pilot-house, was twice floored by falling timbers but not seriously hurt. Mr. Loskill escaped without a scratch, thanks to a quick pair of heels, but he returned immediately and had the injured man taken to the boarding-house, where he was attended by Drs. Adams and Sterriker of Ione, and is getting along as well as can be expected. The derrick, which is the first the company had, which cost \$15,000, is a total wreck.

Nevada.

THE INX MINE.—*Transcript*, June 13: The company represented by Mr. Campbell and which has since last summer been prospecting the INX quartz mine, seven miles above Washington, quit work there a few days ago, after having paid \$6000 on the purchase-money, built an eight-stamp mill, constructed roads and done considerable underground work. This action on the part of the company is said to be based on an unfavorable report on the claim made by John Hays Hammond, who went up there a short time ago and expeted it.

George J. Binder of Oakland, and his partner, who are the owners of the property, and to whom it reverts now that the parties holding the bond have quit, will carry ahead the labor of opening the ledge, and experienced practical miners say their chances for success are favorable. Mr. Campbell, who is an energetic and clear-headed mining man, has not bad his faith in the mineral resources of Washington district shaken by the turn the affairs of the INX have taken, and he will probably take hold of some other ground up there.

THE CENTENNIAL.—A letter from Superintendent Richards to the company's office at Virginia City states that he is making excellent progress driving ahead in the new tunnel, having two shifts of men working. The hard formation encountered is changing to softer material, with favorable indications. The San Jose Co., adjoining, have also resumed operations for the season, and as soon as they can pump out their shaft and get things into practical operation they will commence taking out the rich gravel gold deposit they struck just before the heavy winter snows made them shut down.

MINING BRIEFS.—*Tidings*, June 13: The Emmett Water and Mining Co.'s shaft, adjoining the Evening Star, is down between 80 and 90 feet. It is a double compartment and is timbered to below 60 feet. Since the shaft has been in hard blasting ground, a three-foot ledge of fine-looking ore has developed. Supt. McSherry says that machinery will arrive by the time he is ready for it, about July 1st. The Crown Point mine was started up Friday. Nothing new underground. Cleanup at the North Banner to-day and pay-day to-morrow. The ledge in the bottom of the shaft and in the drifts is three feet thick and of high-grade ore. The mine never before looked as well, and dividends will undoubtedly follow the opening up of another level.

Calaveras.

MURPHYS NOTES.—*Calaveras Prospect*, June 14: At the North Fork mine, one-half mile south of Murphys, of which Frank Monroe is superintendent, a 15-stamp mill and two pulverizers are being put up, which will be equal in capacity to a 35-stamp mill. At the Total Wreck, one mile west of town, owned by Mr. Campbell of San Francisco, an excellent quality of quartz is being worked. The shaft is 150 feet deep, with a steam hoisting works at the mine, and a 5-stamp mill near town, which is to be increased at once to 10 stamps. The owner is now on the grounds.

Placer.

THE DIVIDE.—*Placer Herald*, June 14: Our industries being principally mining, we are more interested in that line than any other. I have to note the continued prosperity of those industries, our paying mines continuing to yield their usual quota of bullion. Messrs. Breece & Wheeler visited their mine the past week, both looking in good health and spirits, well pleased with the output from their mine under the superintendence of Mr. Grinnell, who is now employing about 25 men. The Drummond mine at present seems to take the cake, working to the full capacity of the mill in ore so abundant that the superintendent has dispensed with the night shift; the whole body of the ore yielding \$3 per ton. This to the proprietor means a fortune. It is rumored that the Mayflower will be ready to put on a full force in a few weeks. At present they are engaged in running tunnels preparatory to opening up the mine in the large body of gravel from the immense river-bed extending through their property. The Gray Eagle is pushing its tunnel ahead at the rate of 300 feet per month and expects to strike the body of pay gravel by October.

IOWA HILL.—Cor. *Placer Herald*, June 14: While we do not make any great outcry, I think Iowa Hill holds its own with most of the small mountain towns. The Morning Star mine keeps on the even tenor with a moderate crew of men, under Mr. H. Simons; the Waterhouse & Dorn is reported having the richest cement in sight that they ever had, and I have seen some from there which was very rich. The Drummond mine, near Cottage Home, in spite of the predictions of many soreheads, has been a paying property all winter, although the extra expense incurred on account of deep snow was very heavy. The new tunnel is progressing rapidly and the expectation is that the ledge may be struck inside of 50 feet. The Pioneer is also making over expenses, though they were handicapped by the deep snow also. Red Point is reported as doing well and about to start; the Burleighs soon to extend the main tunnel. I hear that a contract has been let to push the New Basil bed rock tunnel in Black Canyon 400 feet, to start immediately. Reports from Canada Hill and Sailor Canyon are meager, yet hopeful. There are several small mines near here which are worked by their owners principally, which are reported as doing fairly well. Among them are the Watts mine at Monona, Tommy Dick, at King's Hill, and others.

Plumas.

THE BLIND LEAD MINE.—*Greenville Bulletin*, June 11: About two years ago, Archie Warren and John McIntyre struck a ledge of good ore on Wolf Creek near the Wisconsin mill. A tunnel was driven into the hill 230 feet. At first the vein seemed to lie nearly flat, and in following it, the tunnel was run on an incline a part of the distance, until the amount of water rendered further progress impracticable. At the end of this 230-foot tunnel, the ledge stands at an angle of 45 degrees. A second tunnel was started last fall, about 60 feet below the first, and driven under the vein. About ten days ago, an upraise was made for the purpose of tapping the ledge, which was reached after going 15 feet. Mr. Warren informs us that the body of ore is from six to eight feet wide, and that it prospects about \$10 per ton. Considering the inclination of the ore body and the depth of the lower tunnel from the surface, he estimates the backs at about 300 feet. Messrs. D. McIntyre and Archie Warren, the owners, think they have a fine property. It will be remembered that the Gold Stripe Co. had some very rich ore in that vicinity. It is thought that this discovery may be fully as rich and more extensive.

A BRIGHT OUTLOOK.—*National*, June 14: Harley Flournoy informs us that the Genesee mine and Brandt mine are in full operation and showing up well. A party from San Francisco have made a quartz location, and have prospected it enough to feel assured that they have a good mine. The party passed through town on their way to San Francisco, but will return in about a month to put up buildings and commence work to

develop it. It will be but a short time before Plumas will step to the front as the leading mining county of the State.

Shasta.

A DAY WITH A PROSPECTOR.—*Redding Free Press*, June 11: We spent last Sabbath in the hills. Leaving Redding about 6 o'clock, we walked up the railroad track a quarter of a mile above Middle creek, where we were met by Mr. Connor and his son, owners of the Sky Blue mine. With these gentlemen we took an extended tramp, visiting many prospects and gaining a general idea of the mining resources of the section between Old Diggings and the Hartman mine (in the Lower Springs district). Among other prospects we visited the famous Scherer mine on Salt creek. An engine and pump near at hand indicated that the shaft would soon be cleared of water. Below this hole is an open cut leading from the creek, and a fine tunnel 200 feet long into the mountain. Entering the tunnel, we saw two miners drilling holes in the hard, birds-eye porphyry, preparatory to blasting. They informed us that a distance of 450 feet would tap the shaft. We had occasion to cross the old Bunker Hill ground, which at an early day produced tubs full of quartz and rusty gold—a veritable bonanza that was taken out and expended in litigation. After \$80,000 had been extracted the pay chute was lo't, and has never been discovered, although diligent search has been made. Near the Bunker Hill mine can be seen quite a number of prospect holes and indications of surface mining, prosecuted years before with profit. The developments made in the Sky Blue indicate a bright future for this mine. In a northerly direction, all the way over an almost level country to Quartz Hill, can be seen indications of placer-mining, and the quartz croppings close by plainly show from whence those placers were fed. It has been said that "the mines of Shasta do not go down," but the mining done in this section would convince a reasonable man that the miners, and not the mines, do not go down.

SIERRA BUTTES.—We understand that the Sierra Buttes M. Co. on Squaw creek made a cleanup last week after running a month, and that the amalgam was more than any one man in the camp could lift.

Sierra.

GARIBALDI.—*Mountain Messenger*, June 14: The Garibaldi mine at Gold Valley is paying very well. The last run the rock crushed paid about \$17 a ton.

Trinity.

A BIG MINE.—*Journal*, June 14: Last Saturday, in company with a party, one of the *Journal* force found Supt. Loveridge and the efficient foreman, C. E. Goodyear, with the working crew as busy as bees. The immense bank of gravel is being plowed away as fast as the three hydraulic monitors, running 12 hours a day with from 150 to 360 feet pressure, can do it. The face of the bank is now 80 feet and will shortly be 150 feet. The bedrock ditch and eight-foot flume (with undercurrent) have a good and sufficient grade, and no trouble is encountered by either getting blocked. Everything about the mine is in ship-shape style, and nothing is lacking at present in which to work to an advantage and get the full benefit of the supply of water, which will last for several weeks more. As the company are now working as good, if not better, gravel than they have for years, a flattering cleanup is more than probable. The company own 400 acres, and in charge of Supt. Loveridge we went over some of the ground, following the channel leading from the place where the mine is now being worked to the reservoir on the top of the mountain, a distance of one mile. The auriferous gravel can be seen, from the surface down, where the water has cut deep into the channel all the way up to the reservoir, but no sign of bedrock is visible; and right on top of the mountain, where the two ditches empty into the reservoir, is a bank of gravel perhaps 100 feet high. The depth of the gravel in the channel which the company have just faced is estimated to be from 100 to 500 feet, and with the present supply of water would take centuries or more to work. Owing to the misfortune of portions of the ditches sliding away, the loss of water caused the company to lose three months' work, but nevertheless they will make a good showing this season.

CANYON CREEK QUARTZ.—*Journal*, June 14: Geo. Bailey informs us that work is progressing satisfactorily on the mines and locations on Canyon Creek. Work is being pushed on the mines in which he is interested with Grant Flowers and C. W. Smith. A tunnel is being run and it is now in 61 feet. The ground is well suited for tunneling, and the tunnel progresses at the rate of over four feet a day; it is expected that the tunnel will tap the middle ledge within a distance of 30 feet. The tunnel will tap the lower ledge at a depth of 175 feet, and the back ledge at a depth of about 300 feet. The rock in the three ledges carries free gold and prospects well. The gold is heavy and easily saved. If the development work turns out as satisfactorily as expected, a mill will be erected this summer. Carlson, Dedrick & Benjamin have begun work on their ledge and have a good prospect of finding a good mine. Grigsby & Shock are at work on their locations and have first class prospects.

NEW RIVER.—Jas. Mullane of New River says that the past winter in New River was very severe and but little work was done, hence times have been rather quiet this spring. The different claims are now being worked and business will pick up the coming summer. At present the following mines are in operation: Mountain Boomer, Ladd & Clements. Tunnels are being run and ore taken out; the ledge is not large but rich, and the mine is a good piece of property. The ore is being crushed in the company's stamp-mill. Mr. Colgrove is working on the Excelsior, taking out ore and developing the mine. The Irvin mine, found one year ago, is showing up well; quartz crushed from it has averaged over \$75 a ton. Irvin & Ladd are the owners, and they are now running a tunnel to tap it at a lower depth. The rock is crushed in the Mountain Boomer mill. Gulick & Bowles in the Uncle Sam are taking out rock, crushing and running development tunnels. Stephen Sherwood in the Sherwood mine is taking out rock and crushing by arrastra. Fairburn & Co. are taking out ore and doing general development work on the Tough Nut. At present there is too much snow on the Mary Blaine mine for work to be resumed. There will be plenty of water to run arrastras and mills all summer and a good season's work is looked for.

Considerable quartz was taken out last fall and piled up to be crushed, but the heavy snows came and it could not be worked. This will be run through and more taken out and a prosperous season is looked for.

Tuolumne.

GOLD FROM THE BONANZA MINE.—*Union-Democrat*, June 14: One day during this week Nelson Williams picked up several pieces of quartz on Sheppard street, at the lower end of town. They were worth about \$60 to him, that amount of gold being subsequently extracted from the quartz. The rock came from the Bonanza mine, it being used in repairing the street in that locality. Quite a number of boys have succeeded in making small "finds" since gaining a knowledge of Mr. Williams' luck.

POCKET.—*Tuolumne Independent*, June 14: Messrs. Jas. Stone and Pedro struck a fine pocket in their mine on Brown's Flat, Friday of last week, which still holds out. The gold is pure and in abundance, coming out in numerous beautiful shapes, many pieces resembling strips of crinkly ribbon. The mine is owned by Mr. J. G. Pedro of Jamestown, and is leased from him by Messrs. Stoe and Pedro of Brown's Flat on shares. This pocket will, no doubt, reach up to many thousand dollars when it is all taken out, which will add new laurels to what has been a good-paying mine for years.

NEVADA.

Washoe District.

SIERRA NEVADA.—*Virginia Enterprise*, June 14: The west crosscut on the 630 level still continues in a mixture of quartz, clay and porphyry.

UNION CON.—East crosscut No. 1 on the 1465 level is making the usual progress. The north lateral drift is rapidly advanced.

MEXICAN.—West crosscut No. 5 on the 1465 level is in vein porphyry that is beginning to show streaks of quartz.

OPHIR.—On the 1300 level the winze at a point ten feet southwest of the raise is down 21 feet in porphyry carrying low-grade quartz.

UTAH.—The raise going up to the 600 level is still in quartz.

ANDES.—Past week 500 level north drift from No. 2 west crosscut extended 15 feet; formation, quartz and porphyry. On 350 level, west crosscut extended to 260 feet; formation, hard porphyry.

SILVER HILL.—On the 1600 level the east drift has penetrated a formation that carries a promising amount of metal.

JACKET.—A good deal of exploring work is being done in ground that promises well. Are still making regular shipments of ore to the Brunswick mill, Carson river. The ore averages over \$20 a ton.

SEG. BELCHER.—The 1000 raise from the No. 1 east crosscut is up 45 feet, having advanced 30 feet during the week. The top is in low-grade quartz. The joint 850 east crosscut is out a total distance of 550 feet, having been extended 31 feet since last report. The face is in hard porphyry.

ALTA.—The mill continues to be run to its full capacity. The ore worked averages \$22 a ton. The ore-producing sections of the mine continue to look well.

EXCELSIOR.—On the 500 level the east crosscut is making good headway. The face is in quartz and porphyry that yields low assays.

SAVAGE.—During the week we hoisted 530 cars of ore; shipped to Rock Point mill 443 tons and milled 454 tons; average battery assay, \$19.05. We have bullion on hand and at the mill amounting to \$7046.60.

SCOKION.—The southwest drift on the 630 level still continues in a favorable formation composed of a mixture of porphyry and clay.

CROWN POINT.—Shipped to the mill during the week 795 tons 1350 pounds of ore, the average battery assay value of which was \$19.40.

ALPHA.—On the 500 level the west crosscut continues in vein porphyry. On the 600 level the east crosscut is still being extended in a favorable formation of quartz, clay and porphyry.

IMPERIAL.—West crosscut No. 3 from the north lateral drift from the 500 level is out 48 feet, 10 feet having been made during the week, the face showing low-grade quartz.

HALE & NOKROSS.—Are working on the 500, 800, 1250, 1300 and other levels. At several points low-grade ore is showing, and some of these are likely to lead to paying deposits. A good deal of ore is being mined on the 1300 level. The usual amount of ore is being reduced at the Nevada mill—about 1100 tons a week. The ore averages \$20 a ton. There is bullion on hand and at the mill valued at \$18,454.

NEW YORK CON.—The usual prospecting work is being done on the 650, 800 and 900 levels. On the two latter levels some ore of low grade is being encountered. The general outlook at the mine is favorable.

NORTH OCCIDENTAL.—Are still doing repair work.

JUSTICE.—Considerable ore of a good grade is being developed at all points on the 622 level. On the 490 level explorations are being made in fertile ground and some fair ore has been found. The usual amount of ore has been shipped to the mill, and the average assay will be about \$27 a ton.

CHOLLAR.—Good ore is still showing on the 750 level in No. 1 crosscut. No. 3 crosscut is in a favorable formation. The north lateral drift on the 950 level continues in vein porphyry.

CHALLENGE CON.—The joint Confidence-Challenge-Imperial north lateral drift from crosscut No. 1 on the 1000 level (Yellow Jacket 800) is in 30 feet, 25 feet having been made during the week; face showing low-grade quartz. The joint Confidence-Challenge west crosscut from the top of the raise on the 700 level (Yellow Jacket 500) is out 41 feet, 31 feet having been made during the week; face showing low-grade quartz.

OCCIDENTAL CON.—The stopes on the 400 and 450 levels continue to yield ore of a good quality. The winze on the 506 level still shows good ore. The main north drift on the 650 level is showing ore of low grade.

POTOSI.—The winze on the 930 level is making good progress. The bottom is in low-grade ore of good appearance. On the 850 level the prospecting drifts are showing well. The outlook in all parts of the mine is favorable.

CON. CAL. & VIRGINIA.—Work is being done on the 1000, 1200, 1300, 1435, 1500 and 1650 levels. On the 1435 level are following a promising streak

of quartz a foot in width that lies on the west wall. Some good ore is being found on the roo level in the old stopes. On the 1550 level ore is being extracted at several points. The usual quantity of ore has been shipped to the mills on the Carson river, and the average value will be about \$23 a ton.

BELCHER.—The joint 850 east crosscut is now out a total distance of 550 feet, the face being in hard porphyry. The 1300 east crosscut is in 88 feet, and the face is in low-grade quartz.

Central District.

COMING TO THE FRONT.—*Silver State*, June 11: A. D. Wilcox, S. W. Ruse and County Clerk Dunn left this morning for Central district to look at the mines. The district is coming to the front, the Aurum and Locomotive being paying mines, and the Millionaire, owned by A. H. Ruse, it is believed, will shortly be on the paying list.

Prince Royal District.

PROSPECTING.—*Silver State*, June 11: In the early days of Humboldt, rich ore was found at the northern end of the Humboldt range, in what was called Prince Royal district. For some reason or other the mines were never developed to any great extent, and the district was abandoned many years ago. Now a Mr. Bousfield, one of the first prospectors in the district, has returned here and is looking for a lead which he discovered about 27 years ago. He thought he could go right straight to the lead, but so far he has been unable to find it.

COLORADO.

THE DUBUQUE TUNNEL.—*Aspen Times*, June 14: The ore streak recently opened in the Dubuque tunnel in Queen's gulch holds out satisfactorily. It varies in thickness from a few inches to two or three feet, and it has now been followed far enough to lead the management to believe that it is continuous. Ten or twelve tons of the ore has been taken out.

THE JUSTICE.—The flow of water in the Justice has so far decreased that Manager Crowe has been able to start up prospecting operations again in all parts of the property.

CHANGE OF MANAGEMENT.—A change of management has taken place on the Mollie Gibson, Frank Bulkeley having been succeeded by C. E. Palmer. The change was effected on Monday, and Mr. Palmer is now in full possession of the property.

THE BEST FRIEND.—The Best Friend mine in Tourtelotte park continues to take out sufficient ore to pay for development work, but no large body of mineral has yet been met with.

THE BUSHWACKER.—The Bushwacker mine is now producing from 30 to 40 tons of a good grade of ore per day. It is thought that the output for the month ending July 4 will reach \$75,000.

DAKOTA.

BOGUS JIM CREEK MINES.—*Deadwood Pioneer*, June 11: News of recent discoveries of gold and silver ores that had been made down on the eastern side of the Hills, along what is known as the Bogus Jim creek, reaching this office, a reporter was sent to that neighborhood where they were working, and found an outcrop of what we term dry ore about Deadwood, that we walked on for 1700 feet, and were shown the thickness of the ore in at least 15 places, and at no point less than one foot, and at the thickest places five to five and one-half feet of clean ore, rich in silicious matter to say the least, and probably some particles of precious metals. Of the last-mentioned substances none were discoverable to the free eye. Frank B. Yant, one of the prospectors, said that some fair assays had been gotten and a number of traces out of the ore, and so far had not seen a piece of porphyry, let alone a dyke of this rock, in the neighborhood, but if one or two of the last-named intrusives would be found cutting through the quartzite and ore, he would feel sure of finding regular and good pay. He further said that the lower strata of quartzite was but two miles wide and dipped northeasterly toward the foothills and could be traced one and one-half miles in the last-named direction. We found the ores sufficient in quantity and outward appearance. If it has the stuff in it the property is a fine one.

IDAHO.

PRICHARD CREEK.—*Wardner News*, June 11: Most encouraging news comes to us from the north side. The historic banks of Prichard creek seem destined to enjoy another boom equal, if not far greater than, that existing when the first cry of gold was heard there. Recent developments have brought to light the existence of carbonate ore there in large quantities, and the result of future operations in the region of the new find will be watched with much anxiety. The success of the recent discovery will create a new era in the prosperity of the country at large, and every well-wisher of Coeur d'Alene should rejoice accordingly. Silly prejudice should never exist in a mining camp, as the prosperity of one district helps the advancement of another, and nothing conduces to handicap their progress more than a foolish rivalry that has no ground for existence. While we rejoice with the good tidings from the north, we can safely say that the outlook for the South Fork was never so good as at present. The rise in the price of lead is most encouraging and the mines in all localities will in future be worked to much better advantage with the improvements that have been made and the new machinery that has been introduced. Closely identified with the vast mineral product of the country, and in fact every movement tending toward it, are the matchless mines surrounding Wardner.

MINNIE MOORE.—*Wood River Times*, June 11: Work has been discontinued in the Minnie Moore below the 600 level, for the present. Above that level work will be continued by leasers, but the company itself will not be directly responsible for any of the cost of working. Its sole concernment will be the receipt of royalties on the ore extracted. The property not only owes its owners nothing, Mr. Kinnear says, but has repaid all the investment and a satisfactory profit besides. That it has done so well, Mr. Kinnear says, demonstrates how good a mine it is. In addition to all the expensive mistakes made and the cost of the plant, which much exceeds \$100,000, it costs \$50, net, every day in the year, to keep the water out. This, without reckoning office expenses, pro rata interest on capital in-

vested, etc., which would bring the cost fully up to \$75 per day, but the Minnie has been draining the whole country. It is surrounded by the K-dict and other claims of the Miller Brothers, the Queen of the Hills and others; and none of them are doing anything worth mentioning in the way of drainage. Thus the whole expense falls upon the Minnie. If the owners of the surrounding claims ever agree to unite with the Minnie in paying the cost of pumping, the Minnie Moore Co. will be ready to resume operations throughout the mine, and by making a few connections can drain all its neighbors cheaply and effectually, but until then the Minnie will limit its field of operations to the upper levels.

MORE ORE IN THE WAR DANCE.—The second chute of ore was cut into last week in the lowest tunnel of the Emery and War Dance group, on Deer Creek. This chute was cut in the upper workings, and as it has been ascertained to continue in depth, it adds considerably to the value of the property. The ore was cut at a depth of 325 feet. As the lowest tunnel is driven into the hill it attains greater depth with every inch of advance, so that when two or three ore chutes exposed in the upper workings shall be cut it will be at a depth of 400 to 470 feet. This will give the owners a great height of backs and several years' prospecting and development work, before going any deeper.

PLACER POSSIBILITIES.—*Idaho City World*, June 10: The More Creek Bedrock Flume Co. has made a big puff and blow, created a big smoke with but little fire, and has now settled down to doing nothing. It appears that a number of the company want to be in on the dividends but not the assessments—to put in nothing—but be full partners when the dust comes out. That kind of a scheme will fail to work, except to work injury to the country. Bedrock flume has been talked and talked for over 20 years, and thus far all the talk has come to naught. Not a box of flume has ever been constructed. Numbers of companies have been organized, but through scheming, sea-sawing, pulling and hauling, dog-in-the-manger opposition, etc., the millions of money in the bed of More creek still slumbereth undisturbed, and may be gathered in by some future generation. Another enterprise was agitated for many years, but of late the interest in it has been slumbering. It is more in the nature of a theory to be demonstrated than anything else, and in it are magnificent possibilities. It is to sink through the sedimentary deposit—a formation termed by miners a "false bedrock." A formation of this kind has existed in but two or three sections outside of Boise Basin—the most noted being in Australia. By far the best pay there was found between the formation and the solid bedrock. What is underneath this "false bedrock" of the Basin is yet to be determined. A shaft was sunk in the bed of More creek a great many years ago, but after going down over 100 feet, operations had to be abandoned on account of the inferiority of the pumping machinery. Near the junction of Middle and North Boise rivers there is a formation like this of Boise Basin. Above it the ground was just fairly good. New parties got hold of the ground this season, went through the "false bedrock," which was only a few feet in thickness, and between that and the granite bedrock the gravel is immensely rich, running four bits and over to the pan. It looks as if a company could easily be organized in the Basin to sink a shaft and see what is below—between the "false bedrock" and the country rock—the granite. If 20 or 30 would form themselves into a company it would cost each but little, and they would not feel the loss, even if the experiment were a failure. When reminded of the other sections that have yielded so immensely below this same kind of formation, it affords a good foundation for faith in the theory that the best pay in the Basin is deeper down than explorations have yet been carried.

LOWER CALIFORNIA.

ALAMO NOTES.—*Lower Californian*, June 12: It is hinted that there is a gentleman in camp who proposes to put up a 40-room hotel as soon as he can find a suitable location, and arrange for bringing in his outfit on reasonable duties. The output from the mines is greater than ever before and all the mills in the camp are running night and day except the El Paso, and it is waiting for new dies which will be here in a few days. John Albright made a rich strike last week in the Montezuma. A half pound of dirt and rock produced \$5.30. John is happy. The ore in the A-bestos is running over \$40 per ton. The Encantada is a large producer and consequently Russell & Co. are furnishing plenty of mescal to their friends. The Scorpion mine was leased last week and is now one of the heavy producers again. Mr. Howard came up to camp last week to put men to work on the Butler property, but he found only two idle men in camp. He had to go to the Real for laborers, who are now in Alamo. The camp is in great need of good miners. The Newell brothers have made an unexpected strike on the Ulises claim. A 30-ton lot yielded \$65 per ton. Unfortunately the St. David mine has been overflown by water and is now lying idle waiting for machinery. It is reported that the pumping machinery for both the Indian and St. David mines is in San Diego. The final fittings for the hoisting works on the Telmaco arrived by the company's last freight team, and the machinery will soon be working. There was a cave-in on the Telmaco a week or so ago, but nobody was hurt. The Elsinore is being worked in good shape. It is being timbered, has a good force at work and is turning out as much gold as any mine in the camp. Quite extensive placers are being constantly worked in out-of-the-way places among the flats and canyons. The placer miners are the most cosmopolitan and picturesque folks in the whole country. Chinamen by the dozens leave their rude brush huts on the hillsides to toil in the trenches, Mexicans by the dozen with their broad sombreros and red flannel shirts, and Americans—a queer lot of them—all stick to the placers. Some of them make four or five dollars a day occasionally, but the work is hard and the results are uncertain.

UTAH.

ORE.—*Salt Lake Stock Exchange Journal*, June 14: Over a million pounds of Bullion-Bock ore was received in the city Tuesday and Wednesday. Value of the consignments, \$16,000. The Alliance

drain tunnel is now in a distance of 4200 feet, and it is the intention to push it 800 feet farther, when it is expected that a rich vein will be struck. The Centennial Eureka Co. have a large balance to their credit at the bank, and are shipping one car of high-grade ore daily. Sixty-five thousand and twenty pounds of Alliance ore was received in the city and sold yesterday. It assayed 34.05 per cent lead, 74 ounces silver and 72 ounces gold to the ton. The Glencoe has several hundred tons of shipping ore on the dump and a big body of the precious metal in sight. The stockholders are considering the feasibility of building a mill.

WASHINGTON.

LEDGE MATTER.—*Okanogan Outlook*, June 11: Negotiations are on foot for the transfer of valuable mining properties on Ruby hill. The new shaft on the Lady of the Lake is down about 25 feet and in a splendid body of ore. Dennis McDonald, superintendent of the Red Shirt mine in Methew county, came to town this week. The tunnel is now in about 100 feet. There are three men at work on the Modock, adjoining the Idaho mine on War Eagle hill. They have sunk a shaft 14 feet, showing up a good strong ledge. The Modock is owned by L. E. Murray, Alex. McPherson and Jack Waters. Geo. Plunder has four men at work on the Second Thought mine on Ruby hill. They have run a tunnel 83 feet since the first of April, and are now crosscutting the ledge at a depth of 60 feet below the surface. An offer of \$60,000 has recently been refused for this mine. This may seem a large sum, but when taken into consideration that its location is between the Fourth of July and First Thought, both of which are conceded to be mines of great value, the owners are perhaps justified in refusing what might be considered a big price for a prospect.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING JUNE 10, 1890.

- 429,877.—TENSION DEVICE FOR BELTS—A. G. Anderson, Oakland, Cal.
429,841.—MUSICAL NOTATION—C. C. Kropp, S. F.
429,844.—PIPE—J. P. Culver, Los Angeles, Cal.
429,900.—STEAM-GENERATOR—L. E. Fish, Los Angeles, Cal.
429,616.—GRAIN SEPARATOR—W. L. Gilson, McMinville, Or.
429,723.—SHAFTING HANGER—M. D. Hemenway, S. F.
429,917.—HEADER-BRAKE—Hinchliff & Hall, Spangle, Wash.
429,857.—ORE-FEEDER—Loftus & Booth, S. F.
430,036.—CALENDAR—Y. Paez Alameda, Cal.
429,869.—CABLE RAILWAY SWITCH—H. Sawyer, S. F.
429,823.—AMALGAMATOR—C. W. Tremain, Portland, Or.
429,826.—AGING WINES—L. Wagoner, S. F.
430,049.—ORE-CRUSHER—G. W. Weller, Baker City, Or.
430,050.—WAGON-BRAKE—N. A. Wheeler, Alameda, Wash.
19,891.—DESIGN—L. N. Beauchemin, Tacoma, Wash.

The following brief list by telegraph for June 17, will appear more complete on receipt of mail advices: California.—William P. Young and C. D. Middlkauff, S. F., vapor solder; Charles Traflet, Tankeo, Johns, gold-saving device; Theodore A. Wheeler, assignor of half interest to W. F. Wright, San Jose, carriage axle nut; Thomas Williamson, Collierville, tread for wheels; John B. Solin, Fresno City, washing machine; D. Schuyler, San Diego, music-leaf turner; William T. Y. Schenck, S. F., fire-hydrant; Delia McGregory, Los Angeles, machine for making butter; John Mason, Petaluma, gate; Levitt A. Mucktoe, S. F., crib; Jacob G. Kenyon, Port Kenyon, vehicle axle; George Griscl and F. Servio, assignors of a third interest to J. D. Case, S. F., mitch-making machine; Lamont W. Estes, Sacramento, spike-making machine; Charles H. Ensign, Temescal, an I. P. B. Wright, Berkeley, packing for stuffing-boxes; John Wiesenhuber, assignee of the Electric Vapor Engine Co., S. F., single-acting explosive engine; same, double-acting explosive engine; same, cut-off for compound engines; George A. Cavalli, assignor of half interest to C. N. Kirkbride and R. H. Jary, San Mateo, key-hole guard; Cullen B. Bingham, Volcano, crumpling-mill; Mora M. Barrett and J. F. Daly, S. F., two patents for gas engines and one for gasoline engine.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

APPARATUS FOR AGING WINES.—Luther Wagoner, S. F. No. 429,826. Dated June 10, 1890. This invention relates to the artificial aging of wines and distilled alcoholic liquors; and it consists in a means for gradually supplying a small quantity of air, which is caused to flow continuously and steadily into the liquor to be treated, and in a means for filtering said air before it is introduced into the liquor. Wines are at present aged by slow absorption of the oxygen of the air through the pores of the wood of which the cask is made, about 15 to 20 per cent, by volume, of air being required to age the wine in from four to five years. Should the air be introduced into the liquor ton rapidly or directly, the process may be endangered by giving the wine an undesirable flavor, and also by exciting a new fermentation either by the introduction of germs in the wine, or if the germs are already in the wine, in supplying oxygen in sufficient quantities to produce their growth. The object of this invention is

to introduce purified air into the cask in a slow and regular manner, and so gradually that the oxygen may only react upon the acids in the wine, and not be present in sufficient quantity to unduly permit the said reaction or to excite the latent germs if they be present.

PIPES.—John P. Coiver, Los Angeles. No. 429,844. Dated June 10, 1890. This invention relates to the class of pipes which are specially adapted for water, gas and drain pipes, and also for use as conduits for laying electric wires underground, and it especially relates to that class of pipes which are formed of a volute of sheet metal covered with and rolled up in asphaltum. The improved pipe consists of a volute of sheet metal covered with end rolled up in asphaltum, and its exterior bound with wire wrapped side by side several laps around at places desired, said laps being soldered together.

AUTOMATIC SWITCH FOR CABLE RAILWAYS.—Houghton Sawyer, S. F. No. 429,869. Dated June 10, 1890. This invention relates generally to the class of cable railways, and especially to those switch mechanisms which are designed to be operated automatically by the passing car. The invention consists in the novel construction and arrangement of the switch-operating levers. The general object of the invention is to effect an economy in the operation of the road by dispensing with the services of a switchman, effecting this result by a mechanism adapted to be operated automatically by the grip-shank of a passing car. The particular object is to provide a simple, effective, automatic switch mechanism of that class in which one or more levers are pivoted within the tube or tunnel of the railway, said levers being connected with the throw-rod of the switch and adapted to be operated by the passing grip.

ORE-FEEDER.—Edward O. Loftus and Edgar H. Booth, S. F. No. 429,857. Dated June 10, 1890. The invention relates to that class of ore-feeders in which the ore is delivered by a suitable hopper upon a rotating cylinder, by which it is discharged into the mortar of the battery, the motion of said cylinder being derived from and regulated by the drop of the stamps. The invention consists in the novel construction of the feed-cylinder or roller, and in the mechanism by which it is operated. The peripheral surface of the cylinder is corrugated. The peculiarity in the roller rests in the inclined or spiral direction of the corrugations. This apron or inclined corrugated surface is positive in its feed of wet or sticky ore. By having the corrugation inclined or spirally arranged, the ore is dropped out gradually by each depression as the cylinder reaches a certain point, and is continuously and evenly distributed.

CALENDAR.—Yndalecio Paez, Alameda. No. 430,036. Dated June 10, 1890. This invention relates to that class of calendars in which a number of independent disks or plates are mounted within a suitable casing or shell having a sight aperture, said disks or plates being adapted to have a rotary motion imparted to them, and having upon their faces characters giving the necessary information of a calendar, and the invention consists in a series of novel disks or plates and the mechanism for moving them, whereby their characters are successively and properly brought into line with the sight aperture. The object is to provide a simple and portable calendar adapted to be readily operated.

WAVE-FORCE PUMP.—George F. Day and Ernest H. Cole, S. F. No. 429,231. Dated June 3, 1890. This is a device which is called a wave-force pump, and it consists of an open-mouthed cone or chamber decreasing in area from the mouth toward the rear end and having its mouth presented to receive the waves, and in connection therewith of a conducting pipe with check valves. A permanent pier may be employed having one or a series of funnel-shaped chambers so placed that the force of the waves running rushing into the diminishing-chambers will produce such an acceleration of speed and momentum that it will force a body of water through pipes to a considerable height.

FRUIT PITTING MACHINE.—Chas. W. Elkins, Palermo, and Wm. O. Foreman and Stenton Freeman, Bidwell's Bar, Butte county. No. 429,209. Dated June 3, 1890. This is one of that class of fruit-pitting machines in which the fruit is caught between and out by opposing reciprocating knives, the cut fruit being discharged automatically by a swinging or tilting bed. The object is to provide a simple and effective machine for pitting fruit which does not require any manipulation of the fruit, the latter being fed to the knives automatically, out in halves and the pit and halved fruit discharged separately and automatically, the whole operation being performed by a single crank movement.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

MECHANICAL PROGRESS

Improvements in Pipe Making Processes.

The manufacture of pipe for conveying water, gas, oil, steam, heated air, etc., has become an immense and constantly increasing industry, and has consequently engrossed a large share of the inventive genius of the mechanical world during the last few years. Two very novel and bold processes have been quite recently solved—one in Europe and the other in this country. The European (German) invention, known as "Mannesmann's Pipe Molding Process" was recently described in a lecture delivered before the Berlin section of the German Engineers' Association by Prof. Reuleaux. The lively interest excited in the invention was proved by the large number of persons present, among whom were many prominent Government officials. The new process, it was stated is of national importance, and is calculated to bring about

A Complete Revolution in Various Branches of Industry.

In the course of a few seconds a massive block of metal is transformed into a pipe by the compressive action of rollers working from without, no mandril to work inside being required. This sounds somewhat of a technical paradox, and although it has for years been carried out practically, it is a problem that permanently excites the highest scientific interest. The Mannesmann process is adapted to the most varied kinds of metals, even to the hardest steel. The pipes or tubes can be made large or small, thick or thin, both sides or one side open or closed, and hollow hearers can be formed with right-angled cross sections. No boring, seam, brazing or welding is required.

The Process.

When a cylindrical body of soft metal or of glowing iron or steel is pressed between two rollers revolving in the same direction, it, naturally, is moved in the opposite direction to that of the rollers, and is drawn as long as the pressure of the rollers continues to operate. Should the rollers be fixed in an oblique position should their axes not be parallel, but at an angle to the body, not only is a pressure then exercised, but also a lateral pushing action. In such a case, providing the power and speed of the mechanism is great enough, the cohesive resistance is overcome, and a rather remarkable, though quite natural, occurrence takes place. The outer parts of the bodies are driven forward, while the inner parts remain behind, or, to make use of an expression employed by Prof. Reuleaux, the metal block is flayed. It is assumed there is a resistance to the pushing action. This resistance may arise from the block being thicker than the space between the rollers, or from a mandril being pressed against the block, the latter then being driven round the former. In the absence of the resistance no tube is formed, but it is possible to form from a single piece a hollow body closed all round, without joint or seam—a problem which until recently was regarded as insoluble. It is only necessary that at the beginning and end of the block a piece should be thin enough to pass through the rollers without undergoing pressure. In that way perfectly closed tubes are formed, the inside of which is inaccessible. Such tubes have been cut open to ascertain how the inside looked. It was anticipated that a vacuum would exist, but erroneously. The hollow contains hydrogen gas, a slight volume of nitrogen and some inconsiderable mixtures of other gases. Hydrogen is thus contained in steel, and it develops in a vacuum or under the circumstances here given.

The Production of the Power

Necessary for the process is highly interesting. To accomplish a transformation of the character indicated in the space of about 30 seconds, machinery of thousands of horse-power is necessary. The force is, however, only required for 30 seconds. The required power is, so to speak, stored up in an enormous fly-wheel, the revolutions of which are performed with extraordinary rapidity. An ordinary fly-wheel would not do, because it would fly to pieces after having passed a certain moderate velocity. Messrs. Mannesmann therefore constructed a special fly-wheel, the circumferential surface of which is overlaid with cast-steel wire. This fly-wheel can be driven with such rapidity, and without risk, that a force of thousands of horse-power is produced. The process has been developed quietly and unostentatiously. The incomparable firmness of the tubes and pipes obtained by the peculiar spiral arrangement of the metal fiber, through which it is possible to roll several metals into one another, and the possibility of rolling the pipes in all conceivable forms, assures to the process a brilliant future. Among the articles to which the process can be applied may be mentioned pipes for gas, water and compressed air (it is possible to make the last named up to a pressure of 50 atmospheres), boiler tubes, heating pipes, copper telegraph wire with steel core, shafts, railway axles and sleepers, carriage and velocipede parts, iron girders, bridge and pontoon parts, material for shipbuilders, lances, gun-barrels, gun-cases, cannon hoses, grenades, and many other articles too numerous to mention; quite a number of the articles named have already been made and

are in use. The invention is a purely German one. The above is taken from *Kuhlow's* of a recent date.

The American Process.

The *Boston Herald* describes a process as follows, which, if not the same, is evidently quite similar to that attracting so much attention in Germany: Some three years ago a gentleman of this city began the study of improvement in the art of making tubes, and invented several machines and appliances for casting hollow ingots and tubular structures, and for rolling and hammering these, so as to lengthen and thin the walls, thereby forming seamless tubes of great symmetry and strength by methods that were entirely different from any before attempted. Several thousand dollars were expended in experiments and for building machinery, which, by great persistence and by the aid of skillful mechanics, terminated with successful and gratifying results.

Still Another Method

Which, with the one just described, has already been referred to in these columns, is also described in the *Herald* as follows: "But when these machines were perfected and finished, another cheaper and altogether more efficient method of forming tubes was conceived by the inventor, who, after thinking the matter over for a number of months, resolved on building other machinery and of making experiments in a hitherto unheard of and unthought of direction."

"The boldness of his plans may be somewhat appreciated when it is stated that they consisted of rolling a tube, directly from steel, iron, brass, or other metal, in a molten or fluid condition. The undertaking was ridiculed by all mechanics to whom the subject was broached, and was considered as wild a scheme as any that ever had been heard of. But the man gradually perfected and systematized his designs until drawings were made which were deemed satisfactory, although still somewhat crude in detail. The machines were built and fully tested, and it has been demonstrated that what was considered a downright impossibility is as simple and practicable in performance as the commonest of mechanical undertakings."

The Economy of These Methods

Is tremendous, inasmuch as it avoids and renders unnecessary the entire labor, machinery, heating, handling and waste of material belonging to and required in the manufacture of tubes and pipe by the ordinary methods, and when it is stated that one concern made and sold \$13,000,000 worth of tubes at a profit of \$1,250,000 last year, some idea of the importance and far-reaching results of these inventions may be realized. It is claimed that the tubes and pipes made by these methods will be superior in strength and finish to those made by any other known process, the manipulation of the metal being such as to avoid blow-holes or porosities which are found in steel-manufactured goods generally. They will also be symmetrical and smooth inside and outside, and can be used without boring for many purposes where a common tube would not answer. The inventor has still other methods of making compound tubes by casting and rolling one metal around another, fully as practicable and economical, applicable to very large diameters, and constituting with the others a series of inventions which for originality, scope and value have rarely been equaled. Machinery is now being built and the business will be established upon a working basis just as soon as all arrangements can be made.

BOILER MANUFACTURERS' MEETING.—The third meeting of the American Boiler Manufacturers' Association, which will convene in New York on Tuesday, July 1st, promises to be of great importance. The question which will attract most attention is that of forming a boiler manufacturers' insurance company. The committee appointed to consider the subject is a large and comprehensive one, every member of which is committed in favor of establishing the company. The Committee on Materials and Tests will make a further report at this meeting, which will relate to the proportional thickness of iron and steel to the diameter of the boilers. The Committee on Manholes and Manheads, in which there was a division last year, will complete its report, as will also the Committee on Safety Valves and Horse Power. The Committee on Uniformity in State Inspection laws will submit a form for a law governing the inspection of boilers, the adoption of which will be urged upon the different States. It has been arranged that any one who desires may take advantage of the one-third reduced rates by procuring the regular printed receipt of the railroad companies for the full fare paid when leaving for New York. Reduced hotel rates have also been arranged. While in New York the members of the association and their wives will be the guests of the merchants of that city, who have been instrumental in having the meeting held there.

GOVERNORS FOR MARINE ENGINES.—One of the results of the "City of Paris" accident has been the revival of interest in governors for marine engines, and it is to be hoped that this may lead to something definite. The duty which is a satisfactory marine governor must perform, is in many ways so much more difficult than that which occurs in stationary practice that it is not surprising that no practically satisfactory solution of the problem has yet been made, and in spite of the many promising attempts the field is yet open.

SCIENTIFIC PROGRESS.

THE ACIDS OF FRUITS.—George W. Johnson, in his *Chemistry of the World*, says, in describing the "vegetable food of the world": "The grateful acid of the rhubarb leaf arises from the malic acid and bin-oxalate of potash which it contains; the acidity of the lemon, orange and other species of the genus *Citrus* is caused by the abundance of citric acid which their juice contains; that of the cherry, plum, apple and pear, from the malic acid in their pulp; that of gooseberries and currants, black, red and white, from a mixture of malic and citric acids; that of the grape from a mixture of malic and tartaric acids; that of the mango from citric acid and a very fugitive essential oil; that of the tamarind from a mixture of citric, malic and tartaric acids; the flavor of asparagus from aspartic acid, found also in the root of the marshmallow, and that of the cucumber from a peculiar poisonous ingredient called fungin, which is found in all fungi, and is the cause of the cucumber being offensive to some stomachs. It will be observed that rhubarb is the only fruit which contains bin-oxalate of potash in conjunction with an acid. It is this ingredient which renders this fruit so wholesome at the early commencement of the summer, and this is one of the wise provisions of nature for supplying a blood-purifier at a time when it is likely to be most needed. Beet-root owes its nutritious quality to about nine per cent of sugar which it contains, and its flavor to a peculiar substance containing nitrogen mixed with pectic acid. The carrot owes its fattening powers also to the sugar, and its flavor to a peculiar fatty oil; the horseradish derives its flavor and blistering power from a volatile acid oil. The Jerusalem artichoke contains 14½ per cent of sugar and three per cent of inulin (a variety of starch), besides gum and a peculiar substance to which its flavor is owing, and lastly, garlic and the rest of the onion family, derive their peculiar odor from a yellowish, volatile, acid oil; but they are nutritious from containing nearly half their weight of gummy and glutinous substances not yet clearly defined."

IMPROVED PHONOGRAPHS.—Two of the principal objections that have been urged against the phonograph and other talking instruments with which the public have become tolerably familiar are the metallic quality of the voice reproduced and the necessity of using hearing tubes, arising from the poor volume of the reproduction. Lieut. Bettini claims that in his micrographophone, as he calls it, these difficulties have now been overcome by the employment of several independent diaphragms instead of the one diaphragm of the usual instrument. It is said that the reproduction of the human voice is singularly clear and free from any harshness or metallic sound. By the use of a non-metallic trumpet the tones are still further softened. In reproducing music the notes of different pitch come out with a singular distinctness, and what is a crucial test, the timbre of the voice is admirably preserved. The characteristics of the record are relative loudness and absolute distinctness. Even a whisper is whispered back from the diaphragm very clearly. Another novel improvement in the phonograph is one which has for its primary feature the transmission of sound by the vibration of glass. From a glass diaphragm extend a number of glass tubes of various sizes communicating with an ordinary wire. Very clear and distinct utterance has been found to result on trials over a line three miles long.

TRANSMUTATION OF COTTON SEED.—Was there ever, says the *Bankers' Monthly*, such a history as that of the cotton-seed? For 70 years despised as a nuisance and burned or dumped as garbage, then discovered to be the very food for which the soil was hungering, and reluctantly admitted to the rank of utilities; shortly afterward found to be nutritious food for beasts as well as for soil, and thereupon treated with something like respect; once admitted to the circle of farm industries, it was found to hold 35 gallons of pure oil to the ton, worth in its crude state \$14 to the ton, or \$40,000,000 for the whole crop of seed. But then a system was devised for refining the oil up to a value of \$1 a gallon, and the frugal Italians placed a cask of it at the roots of every olive tree, and then defied the Borean breath of the Alps, and then experience showed that the ton of cotton-seed was a better fertilizer and better for stock when robbed of its 35 gallons of oil than before, and that the hulls of the seed made the best of fuel for feeding the oil-mill engine, and that the ashes of the hulls scooped from the engine's draught had the highest commercial value as potash, and that the "refuse" of the whole made the best and purest soap stock to carry to the toilet the perfumes of L'Infin and Colgate. Verily, here the touch of the wand of science has been little short of magical.

HOW DIFFERENTLY WE LOOK AT THINGS.—You and I see everything, to some extent, differently. You see things from the standpoint of your previously acquired ideas; I from mine. Strictly, no two persons can see the same thing in the same way, for it can never happen that two persons have precisely the same groups of ideas relating to any subject. These depend on our past experience, on our education, on the beliefs of our times, on our various sects or

parties, on our pet theories, our interests, and our desires. Here is a simple illustration: Suppose an artist and an engineer standing side by side overlooking a tract of country. What they perceive is the same; what they apperceive is wholly different. To the engineer, the country presents itself as a possible line for a railroad, with here advantageous grades, and there economic bridges. Before the artist is spread out a landscape, with light and shade and harmony of colors. Suppose, again, a plot of level ground in the suburbs of a city. A college student, riding by, apperceives it as a possible ball-ground; a young girl, as a tennis court; a speculator, as an addition for town lots; an undertaker, perhaps, as a possible site for a cemetery.—*Popular Science Monthly.*

SUCCESS A MATTER OF CHARACTER.—It is a great mistake to suppose that the best work of the world is done by people of great strength and great opportunities. It is unquestionably an advantage to have both these things, but neither of them, quoting from the *Manufacturer and Builder*, is a necessity to the man who has the spirit and the pluck to achieve great results. Some of the greatest work of our time has been done by men of physical feebleness. No man has left a more distinct impression of himself on this generation than Charles Darwin, and there have been few men who have had to struggle against such prostrating ill health. Darwin was rarely able to work long at a time. He accomplished his great work by having a single aim, and putting every ounce of his force and every hour of his time into the task which he had set before him. He never scattered his energy, he never wasted an hour, and by steadily keeping at it, in spite of continual ill health and of long intervals of semi-invalidism, he did a great work, and has left the impression upon the world of a man of extraordinary energy and working capacity. Success is rarely a matter of accident; always a matter of character. The reason why so many men fail is that so few men are willing to pay the price of self-denial and hard work which success exacts.

POWER OF WATER.—The power of water to dissolve lead in leaden pipes is at present attracting much attention. In Great Britain the lead pipes for conveying water-supplies are apparently becoming a serious source of lead-poisoning. A new source of the power of water to dissolve lead is likely to be ascertained. The *British Medical Journal* says: "The fact that in recent years the water supplied to many towns has for some reason come to possess the power of dissolving lead to an extent sufficient to produce widespread prevalence of lead-poisoning among consumers is a serious matter. Dr. Klrker found that the power of certain samples of water to dissolve lead was directly proportional to the number of microorganisms which they respectively contained. Upon this hypothesis, the acid reaction which renders water capable of dissolving lead may be due, not to sulphuric acid derived from a pyritous soil, but to the chemical products of bacteria." If this, as well as other theories regarding the action of water in dissolving lead, be established as true, some substitute for leaden water-pipes will be in order.

HOW FAR WE CAN SEE.—There has been a great discussion going on in Europe concerning the distance at which large objects on the earth's surface are visible. Emil Metzger mentions that he once saw Keizerspicks, in Samatra, when separated from it by a distance of 110 English miles; he also says that on very favorable occasions he has made out to see Gny Merapi, in Java, when 180 miles intervened. E. Hill, the civil engineer, says that he has seen Mont Blanc from Piz Muran, near Disentis, a distance of almost 120 miles. J. Starkie Gardner states that Mont Blanc is visible from Piz Landgard, though distant about three degrees. Waymper, the explorer, says that when he was in Greenland he could plainly see a mountain peak from which he was separated by 150 miles. The whole range of the Swiss Alps have been looked upon by J. Hipolyte while 200 miles away; Sir W. Jones affirms that the Himalayas have appeared to his view from the great distance of 224 miles!

SCALES THAT WILL WEIGH A HAIR.—The fine gold weighing scales made in Philadelphia and intended for the mint at New Orleans, a few years ago, are marvels of mechanical invention and expert workmanship. The larger of the two pairs has a capacity of 10,000 ounces troy, or about 636 pounds avoirdupois, and when loaded to its full weighing capacity will indicate the variation of the one-thousandth of an ounce. The other and smaller pair is intended for lighter work. All its bearings are of the finest agate which have been ground with remarkable precision. This instrument is believed to be the most delicate in the world. It will give the precise weight of a human hair, and is susceptible to the slightest atmospheric changes.

MAN IS THE ONLY ANIMAL THAT HAS TEETH.—In horses, canines and molars—of an equal height. Man, the ape and nearly all ruminants, have 32 teeth. The hog, however, is better off than this, and has 44. So have the opossum and mole. The river dolphin of South America lays far beyond this, however, having no less than 222 teeth. Teeth are not part of the skeleton, but belong to the appendages, like skin and hair.

GOOD HEALTH.

The Rational Use of Medicine.

Nothing illustrates more clearly the modern progress of medicine than the disappearance of the bulky and disagreeable boluses, powders, draughts and mixtures which the physicians of former times administered to their patients. In many cases with but little effect except to put an additional burden upon an already wearied and overloaded stomach. The homeopathic physicians have at least shown that excessive medication is unnecessary, and that no medication at all will result in an equal number of cures in a great majority of cases, while the present tendency of all schools of medicine is to limit their prescriptions, both in number and quantity, and place more reliance upon hygienic and sanitary precautions, combined with watchful and experienced nursing and care. The philosophy of prescribing what are popularly known as "medicines" is really a very simple matter. It is a well-known fact that certain substances, when taken into the system, produce certain physiological effects. Thus, opium and its alkaloids produce sleep, Ipecac causes vomiting, quinine is found to have a remarkable power of controlling intermittent fever, and so on through the list. There is really no difference between a medicine and a poison, except in the violence of its action; and, in fact some of the most powerful poisons are found to be valuable medicinal agents when administered in minute doses. The scientific physician, therefore, will not attempt to "cure" a disease by any specific remedy, but will endeavor to fully understand the cause and nature of the abnormal physiological action which is taking place in the system of his patient. As the action of medicines is very variable in different persons, and under different conditions of the disease, the necessity of skillful medical attendance, and the folly of depending upon the various widely-advertised patent medicines is evident.—*Popular Science News.*

Elevator Sickness.

The elevator in modern big buildings has only one drawback—the sickness it causes when the car is suddenly stopped. To people of a delicate constitution this sickness is often such a serious matter that to them the elevator is a dangerous blessing. This sickness, says a contemporary, can be avoided by observing simple physical laws. Elevator sickness is caused by the same law that throws a person to the ground when he gets off a moving car in the wrong way. The stoppage of the elevator car brings a dizziness to the head and sometimes a nausea at the stomach. The internal organs seem to want to rise into the throat. All this comes from the fact that all parts of the body are not stopped at the same moment of time. The feet being next to the car floor stop with the car, while other portions of the body continue moving. If the body as a whole can be arrested at the same time with the feet there will be no sickness. This can be done by placing the head and shoulders against the car frame. Then there will be no sickness. It is a sure preventive.

THE HUMAN BREATH A POISON.—At a recent meeting of the Académie des Sciences, Prof. Brown-Séquard referred to some experiments he had conducted with a view to determine what, if any, were the toxic effects of the human breath. In condensing the watery vapor coming from the human lungs, he obtained a poisonous liquid capable of producing immediate death. This poison is an alkaloid (organic), and not a microbe, or series of microbes, as might have been imagined. He injected this liquid under the skin of a rabbit, and the effect was speedily mortal. The animal died without convulsions; the heart and large vessels were engorged with reddish blood, contrary to what is observed after ordinary death, when the quantity of blood is moderate and of a dark color. In conclusion, this eminent physiologist said that it was fully proved that respired air contained a volatile toxic principle far more dangerous than the carbonic acid, which was also one of its constituents, and that the human breath, as well as that of animals, contained a highly poisonous agent.—*Medical Press.*

WOMEN DOCTORS.—Sir William Gull, the eminent English physician who died recently, when asked his opinion on women doctors, expressed himself as follows: "Personally" he said, smiling, "I should only be too pleased to be called in consultation with one of my fair confederates, but such has not often been my fate." Then, more seriously, he added: "I think one ought always to help women study medicine in every possible way. I have the greatest respect for the ladies now practicing in London, and feel sure that they must fill far more satisfactorily than the average medical man could pretend to do, certain posts. A young child at first would always rather be attended and operated upon by a woman than by a man, though they get wonderfully soon accustomed to 'the doctor'."

A CELEBRATED GERMAN REMEDY FOR BURNS consists of 15 ounces of the best white glue broken into small pieces in two pints of water and allowed to become soft; then dissolve it by means of a water bath and add two ounces of

glycerine and six drachms of carbolic acid; continue the heat until thoroughly dissolved. On cooling, this hardens into an elastic mass covered with a shining, parchment-like skin, and may be kept for any length of time.

USEFUL INFORMATION.

The Seal.

A recent issue of the *Alta* recorded a curious peculiarity in the habits of seals which may possibly lead to important results in hunting for these valuable and interesting ocean inhabitants. The bell buoy which is kept over Noonday Rock to notify mariners of the exact position of that dangerous submerged rock had drifted from its moorings and gone to sea. The rock is located near the Farallone islands, in about 18 feet of water. Much difficulty was anticipated in finding the rock, which had to be done by sounding. When the sounding party reached its vicinity, it was decided to test the truth of an idea that many sealing men entertain. It is necessary to explain said idea. It is well known that there are innumerable seals and sealions along this coast. Old sailors say that seals frequent and flock around submerged rocks as well as rocks that appear above the water, and that if they can be alarmed by a loud, sudden noise or a concussion in the water, they will rise to the surface in a body from around a submerged rock, and that one can rest assured that the middle of the rock is below the center of the group of sea animals.

"Let us give that idea a practical test. It will do no harm," said Captain Davies, addressing Inspector Captain Perry.

"All right; pull the rope," was the reply. Captain Davies grasped the cord to the steamer's whistle and gave it a dozen short, sharp jerks. The noise was deafening, and, of course, produced a concussion on the waves. All hands watched the surface of the surrounding water. Several seconds passed, when suddenly, off the port side, innumerable seals were seen to come to the surface. There were hundreds of the animals, and they stretched themselves as far out of the water as possible to find what had disturbed their repose beneath the waves. The steamer was several hundred yards distant from the group, which covered half an acre or more of space. The experiment was a success, but the Madrone was so far away that the inspector, not wishing to put the buoy in at random, decided to try it again. So, taking his bearings, he steamed away, so that the seals might settle down on the rock again. Later in the day the steamer returned to about the place where the seals arose before, and again the heavy-voiced whistle was blown, and once more the sea animals came to the surface near the vessel. It was a peculiar sight. The sea for a long distance around was actually alive with the curious mammals. Soundings were made near the middle of the group, and the rock found. In a short time the buoy was put overboard and anchored over the rock, and once more a deep-toned horn warns the mariner of the presence of danger beneath the sea.

WHAT IS RATTAN?—Every one knows the pretty, light and graceful chairs and other articles of furniture made from rattan, but every one does not know that the extremely tough and flexible wood called rattan is that of a climbing palm-tree. This curious climber (which is more of a vine than a tree) is one of the singular characteristics of forest growth in the Celebes and other Malayan countries. Starting with a trunk as thick as a man's leg, it winds through the forest, now wrapping a tall tree in its folds, like some gigantic snake, and then descending again to earth and trailing along in snake-like curves until it can find some other stately tree to fasten and climb upon in its pursuit of light and air. The forest is so thick and jungle-like that it seems impossible to follow the course of any one of these serpentine climbers; but there is little doubt that at the last the successful aspirant, which stooped and orange so long below, will be found shooting up like a flagstaff a dozen feet or more above the tree which has helped its rise. A use of the rattan, which is unknown to those who have not seen it in its native forest, is a water-carrier. The thirsty traveler has at all times a tumbling of cool, refreshing water at his command by cutting off six or eight feet of the rattan and putting one of the severed ends to his mouth, or holding it over a dish to catch the water.

THEY ARE NOT SIMILAR.—Many people think that gutta percha and india-rubber are the same or very similar gums. This, however, is a mistake. India-rubber is the solidified sap of a South American tree. It is of a soft, gummy nature; not tenacious, but very elastic; is easily decomposed by oily substances, and does not stand acids well. Gutta-percha, which is only found in the East Indies, is obtained from the gutta tree. It is a brownish gum, which solidifies by exposure to the air.

SILK IMITATIONS.—We recently made some reference to a process for producing artificial silk. In discussing the latest development in the line of silk imitation, an English contemporary says: "Celluloid 'silk' is a cleverly fabricated tissue, which ought to be repressed by common consent, or, if necessary,

by parliamentary prohibition. Nothing so useful to dishonest dealers, and so dangerously inflammable, has hitherto been invented in the way of clothing. It is certainly cheap and handsome, and is therefore more tempting to the thoughtless or the defrauded who may be induced to buy as 'silk' a material which a spark would inflame, and which would burn with the fierceness of a rag steeped in petroleum. It may be in the future possible to lessen this inflammability, but the small sample referred to went off like a flash, and we may assume it was as fire-proof as can at the present time be made."

SHOP NOTES.

Shop Suggestions.

We clip the following "suggestions" from the *Boston Journal of Commerce*:

It has recently been ascertained that wood can be glued together so firmly that the joint will be as strong as the wood itself. Iron can be treated in the same manner, only it takes several days for it to set. There should be a sulphuric solution that would cut right in and get a hold at once and unite the parts as readily as electric welding. [For the formula by which this cement is made, see item in mechanical column of the present issue.]

A mechanic has been at work for a long time in making a pinion for a large gear that will run without rattling the machinery in pieces, and claims to have got his best results with green hide, wound in edgewise with sheet iron spirally, and bound together with rivets. A gear being noisy is not the only hindrance in putting up machinery. Belts are not only cheaper, and can be set up in less time, but manage to do their driving without being so positive in their action. Their ability to slip is a great safeguard in many establishments.

A crank on gearing, having the correct forms of gear teeth uppermost in his mind, was called upon at one time to explain his theory before an audience of engineers and mechanics. After taking up nearly his allotted time in explaining that the form of gear teeth should be such that the line of action will pass through the pitch point, and that every draughtsman should be careful and get an outline that will hold the active train in the right direction, some one of his hearers inquired how it was possible to lay out a gear tooth that would act otherwise. It is a principle in mechanics that if gear teeth keep in contact while the wheels are in motion the line of action must come where the pitch circles touch each other, and yet there is a case where a man of learning was trying to have a mechanic do that which he could not help doing if he would.

It is much easier to explain matters after they have taken place than to reason out what will take place beforehand. A belt man was called upon to explain why a belt should creep two per cent when there was a heavy load upon it. Thinking that the creep must have been a positive slip, he entertained his hearers for about half an hour with an explanation that all could understand, and was then informed that the creep was a negative one, creeping just opposite from what would take place with a slip.

Expansion of metals works some queer freaks which do not quite agree with reasoning. Just call on any one to explain why railroad rails are curved downward when they are rolled out, and they will show at once that it is to make them come out straight when they get cold, and proceed to give the reasons for it, which is far more reasonable than the facts of the case will bear them out in. Iron can be upset while hot by the shrinkage of some of the parts that cool first, and produce a result that was not reckoned on. Like the foundryman with his core bar, had they increased in length, he would have understood it, but the trouble was they grew shorter, and there was the mystery.

THE MEN WHO STAY.—Young mechanics make a very egregious mistake, says the *Builders' Gazette*, when they begin to think that they do too much for their employers when they work a few moments overtime to complete a small task they are performing, just at the time the whistle blows to quit work. More young men have been kept from receiving an advance in their wages from this than from any other known cause. Employers watch the movements of young men very closely, and the least little thing oftentimes places them in an unfavorable light before their employers. It is the young man who studies the interests of his employer, and is not afraid to give him a few moments that gets the rapid advancement. He is the young man selected when there are any favors to be granted. I can tell in 20 minutes in any workshop the young man who is most likely to succeed in his trade. He is the last to leave his work and is always prompt in beginning it. The fellow who drops their work at the moment the whistle blows, are always the ones that the employer is ready to discharge when business gets a little slack.

CHANGING EMPLOYEES.—Don't keep continually discharging your employees and hiring others in the search for better men. Those you already have are probably all right, if properly developed; and a man's value to you ought to grow in proportion to his length of service. If you don't efficiently remunerate faithful, intelligent service, you will never get good men, or, at least, you won't keep them.

ELECTRICITY.

Working Railroads by Electricity.

At the Cincinnati meeting of the American Society of Mechanical Engineers, Mr. W. E. Hall read a paper on the working of railroads by electricity. He held that with electric motors it would not be necessary to have track tanks and water stand-pipes distributed closely throughout the line, and time and expense would be saved. It would not be necessary to carry the dead weight of tender and its load. The experience with the centralization of power, where large hydraulic, pneumatic or electric plants are in operation, is that a greater amount can be supplied than is necessary to develop at the station—'hat is, where there is much division 50 to 60 horse-power plant can take and supply satisfactorily about 100-horse power. The reason for this is that it never occurs that all the power is used simultaneously. Multiplication of parts increases the number of pieces to wear and consequent repair, as well as the chances of failure from breakage. In the discussion that followed, one of the members exhibited an estimate showing that the cost of establishing an electric railroad could not be less than \$219,356 for the power alone. H. O. Spalding held that the next step in that direction will be the adoption of high potential currents along the track and low potential motors run by induced currents. This is successful in electric lighting, and may be used in transportation. The entire absence of reciprocating parts is a most important feature of the electric motor. Another point is that the higher the speed the greater the economy, as the usual 16 to 1 gearing is reduced. Further, the adoption of electric motors would give an opportunity for the utilization of the water-powers of the country.

EFFECT OF ELECTRIC LIGHT ON PLANTS.—A beautiful illustration of the effect of electric light was recently given by Dr. Siemens before the Royal Society of England by placing a pot of huddling tulips in the full brightness of the electric light in the meeting-room, and in about 40 minutes the buds had expanded into full bloom. Dr. Siemens told that he had planted a number of quick-growing seeds, such as mustards, carrots, melons, etc., and having divided the pots into four groups, had one group kept entirely in the dark, one exposed to the influence of the electric light only, one to the influence of daylight only, and one to daylight and electric light in succession. He applied the electric light each evening from 5 o'clock to 11 o'clock and left the plants in darkness for the remainder of the night. According to his observations, the plants kept entirely in the dark soon died; those exposed to the electric light only, or to the daylight only, thrived about equally, and those exposed to both day and electric light thrived far better than either.

ELECTRICITY IN THE HOME.—Prof. R. H. Thurston, in a recent article, gives a graphic description of what electricity will do in the near future. He says it will break up the present factory system and enable the home worker once more to compete on living terms with great aggregations of capital in unscrupulous hands. Great steam engines will undoubtedly become generally the sources of power in large cities, and will send out the electric wire in every corner of the town, helping the sewing woman at her machine, the weaver at his pattern loom, the mechanic at his engine lathe, giving every house the mechanical aids needed in the kitchen, the laundry, the elevator, and at the same time giving light, and possibly heat, in liberal quantity and intensity.

DRUGS ADMINISTERED BY ELECTRICITY.—Recent experiments have demonstrated that small doses of certain drugs can be made to pass through the skin between the poles of a galvanic current. Dr. Cagney reports having used iodide of potassium in this way for the cure of labyrinthine deafness and in lead palsy. The method is best adapted for the treatment of diseases of the skin itself, or tumors immediately beneath, and of mucous membranes. It offers the advantage of conveying a useful but not readily tolerated drug—probably in a state of maximum activity—directly to the part where needed, while many cases may be benefited at the same time by the stimulating action of the galvanic current.

Edison, when in Paris, laid great stress upon the fact that it was dangerous to be sending, side by side with gas conduits through antediluvian Paris, electrical currents by wires charged with high-tension currents, and predicted that explosions would be the result. Many explosions from this cause are now occurring in Paris, and the newspapers of that city are reverting to Edison's warning.

MORE WEIRD THAN POETIC.—Pryotechnic effects in table decoration are rampant. Electric wires are run through the stems of tulips, white lilies and jonquils; a bunch of them planted in an espartaco give the red, yellow, green and brown fruit the glow of enchantment, and when the white, bright light streams from a plaque of nita the sensation is rather more weird than poetic.



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Passing Events.

Work has been commenced on the new smelting works at Spokane Falls, Washington. The plant will consist of two water-jacket blast furnaces, with blowers, roasting furnaces, etc. The smelter will carry a large stock of ore on hand, and will be of great advantage to all outlying districts, especially the Cœur d'Alene region.

Only one of the cruisers was awarded to the Union Iron Works of this city, though it was at first supposed that they would get two. However, the building of this one vessel means the expenditure here among mechanics of \$1,795,000.

The molders' strike has not yet ended, although the union has offered a conference with a view to compromise the issues. The foundrymen, however, refuse to have any conference, seeing no reason for a meeting in view of the fact that they have employed other men in the places of the strikers.

There is an abundance of water in all the streams this season for milling purposes, and this will continue until the rainy season, owing to the great quantity of snow stored in the mountains.

The water in the Carson river is now at such a stage that all the mills are being run to their full capacity. As the nights are still cold in the mountains, it is expected that the present volume of water in the river will be so decreased that there will be room between banks for any freshet that may result from the next warm spell.

Free Coinage of Silver.

The action of the United States Senate in passing a bill providing for the free coinage of silver, shows the independence of that body, and also that party whip had no control when a large majority of the citizens of this country demanded any favored measure. There is not a State Grange but at its last annual meeting spoke unqualifiedly in favor of the free coinage of silver. Labor unions have done the same, while business men throughout the West and South and in several of the Eastern States have taken the same grounds. The most formidable opposition to free coinage has come from Wall-street gold-bugs, who apparently are controlled by the incentive for high interest, and with lessened money, more profitable speculative corners. This element is also backed by English capitalists. Henry Claws very pertinently said lately that "not long since 4 1/2 pence per ounce was the market value of silver in London, and it would not probably be much more than that now had the present agitation of the silver question not been brought up in Congress. The interest of the great merchants in London whose business is with the East, always favors a low price for silver bullion, and their efforts have been to depress the price. London has now lost the power of dictation to the silver market, and this country, which is entitled to it, has assumed it. If the present silver bill passes, the power of dictation will remain here, and London will adopt and follow our figures."

The Senate bill has gone back to the House as a substitute for that of the latter. At this writing it is difficult to form any decided opinion as to what the latter body will do with the bill, but it looks as if a conference will be held and a bill agreed upon; yet those in position to know affirm that the lower house will accept the free coinage bill of the Senate, and if President Harrison vetoes it, it will be passed over his head. With this a law, steps will be taken to draw European governments into favoring bimetallism, as was recently outlined in a speech by Hon. Francis G. Newlands, to whom credit is largely due for the success of free coinage in the Senate.

Another Cruiser to be Built Here.

While the \$100-ton cruiser was awarded to Wm. T. Cramp & Son of Philadelphia, the contract for the Cruiser No. 6, of 5500 tons, the largest ever built on the Pacific Coast, was given to the Union Iron Works of this city at a price of \$1,795,000. Prominent foundrymen aver that the molders' strike will have practically no bearing on the construction of the new cruiser, as the men now in the shops are perfectly competent to do all that is required.

It is a matter of great regret that the Navy Department saw fit to accept the plans of Cramp & Son for the \$100-ton vessel. On the plans submitted by the Department, the Union Iron Works had the lowest bid. On the separate plans submitted by the respective firms, however, that of the Philadelphia one was lower than that of our California shipyard. It was therefore decided to give the work to Cramp & Son for the larger vessel, while the 5500 ton ship comes to us. On the \$100-ton armored cruiser, the Union Iron Works' bid was \$3,100,000 and the Cramps' bid was \$50,000 higher. The Cramps put in a bid of \$2,985,000 if their own instead of the Department's plans were used, and the Union Iron Works offered to build on their plans for \$3,000,000, or \$15,000 more than the Cramps.

There has been some indignation expressed that the lowest bid on the Department's own plans was not accepted, instead of letting the Cramps get the vessel on their own plans, and this has been looked upon by many as savoring more or less of "politics." However, California has not very much to complain of at present in the matter of building Government vessels, as one has recently been launched, one is ready to launch and another is being started. The last award gives us the largest vessel ever built here.

An explosion in the coal mine on Hill's farm, Fayette Co., Penn., on the 16th, entombed 30 miners. The disaster is the worst ever known in the Connelleville region. Rescuing parties are at work, but there is little hope of getting any of the men out alive.

The Molders' Strike.

Some statements having been made in dispatches from Washington to the effect that the prevailing strike in this city was likely to interfere with the awarding of contracts for building Government cruisers, the foundrymen here telegraphed to the Secretary of the Navy that their shops would be at the disposal of the Union Iron Works for castings, and that work would not be delayed. In answer a dispatch was received from the Secretary of the Navy, who said that while he regretted the strike, his action would not be influenced by it. Meantime the Molders' Union sent a communication to the Foundrymen's Association suggesting a conference to adjust differences. To this the following reply was sent:

SAN FRANCISCO, June 16, 1890.

To Iron Molders' Union, No. 164 San Francisco—GENTLEMEN: In answer to your communication of the 14th inst., our association begs to state that the members of your union left our employ on March 3d without notice, and that we have employed others to take their places who are satisfactory to us; and as we have not taken any action to prevent your members from working in our shops with all the just privileges of American citizens, we therefore do not know of anything to adjust, and for that reason see no occasion for a meeting.

We join you in the hope that the cruisers will be secured for this coast, and feel satisfied that the work can be completed here in a manner to reflect credit on this city. Respectfully yours, etc., ENGINEERS AND IRON FOUNDERS' ASSOCIATION OF CALIFORNIA.

By R. S. MOORE Secretary.

This reply virtually not only declines a conference, but means that the foundrymen positively decline to have relations with the union as a body, but will accept individuals in their shops should they choose to apply for work.

The issue between the foundrymen and molders is now clearly defined and understood. The foundrymen are willing to take the men back as individuals, but they must work with any others employed, whether union men or not, and no union rules will be tolerated. They will abide by the ultimatum of March 10th, as published in the PRESS. The foundrymen contend that if they accede to the strikers' demands, they must close their shops. While the shops are not working full-handed, they have men enough for ordinary work, and others are coming. Thirteen more molders arrived this week and were put at work in the foundries.

Notwithstanding the labor troubles, one of the proposed cruisers was awarded to the Union Iron Works and she will be built here.

On Thursday a suit was filed in the County Clerk's office entitled the Union Iron Works against the Iron Molders' Union, No. 164. The plaintiff seeks to recover \$10,000 to compensate the corporation for damages caused by the union enticing a number of workmen away from the plaintiff's employment.

It is alleged in the complaint that Thomas Fitch, Thomas Evans, Mat Dole, Leonard Mager and John O'Neill were mechanics skilled in the science of iron-molding, and were in the employment of the Union Iron Works on June 11, 1890, and were so employed for about two months prior to that date. On the 11th of June the defendant, "intending to injure the plaintiff and to deprive the corporation of its employees, went to each of them and enticed them to leave the service of the plaintiff."

Forest Tree Distribution.

The State of California has received from Mr. Abbot Kinney of Lamanda Park a donation of many thousand young forest trees reared at that gentleman's expense. In making this presentation he has selected the State Board of Forestry as the proper channel for the direction of them to the best uses. Such of these trees as are not required to perfect their own plantations will be distributed, during the coming season, to such applicants as will conform to the board's request to furnish the customary reports as to locality planted, growth made, conditions observed, etc.

In selecting the State Board as the medium for the dissemination of these trees, Mr. Kinney was doubtless influenced by the knowledge that the intelligent direction and tireless efforts of the chairman of the board, Hon. Walter S. Moore, to foster and promote the cause of forest planting, would be fully exercised to insure such disposition of this magnificent gift as would result in far-reaching benefit to the people of the whole State. The secretary of the board is Sands W. Forman, 35 Flood building, S. F., and the forester is W. S. Lyon

of Los Angeles. We presume applications addressed to either of these officers will go properly on record for the coming winter's distribution.

Academy of Sciences.

At the meeting of the California Academy of Sciences on Monday last, Dr. Carrington Bolton of the New York Lyceum of Natural History delivered a lecture on "Sonorous Sand," a sand which is found in various parts of the world. He had specimens of sand in a bag, which, when pushed together, gave forth a sound. Dr. Bolton has traveled extensively, and has made this subject a special study. He had with him sands from Arabia, the Hawaiian Islands and other localities.

Prof. Carl Lumbaltz, of the Royal Academy of Sciences, Christiania, Norway, delivered a lecture on "Explorations in Northeastern Australia," which was illustrated with stereoscopic views. Prof. Lumbaltz was sent out from Sweden to study the fauna and civilization of Australia, and his lecture was closely listened to. He began by saying that many people had only the most vague idea of the extent of that country, and he informed his hearers that it was nearly as large as the United States, leaving out Alaska. He said it was easy to exist in Australia, and all manner of civilization could be found there. He described it as the wonderland of the scientist. His travels extended into Queensland, and he illustrated his remarks with views of the scenery, natives and their weapons, animals, etc. Of the native Australian he said that the latest theory advanced was that there was a kinship between the African and Australian negroes, and he mentioned some of the points of similarity between them. He stated that there was no rain in Queensland, frequently for eight or ten months in the year. He told of the low state of civilization there, and said most of the vegetables grown were poisonous, and that nearly all needed preparation before using. He said the natives in the interior where he was, ate poisonous snakes and reptiles, and in some instances practiced cannibalism, but did not like white human flesh because it was too saltish. His lecture was attentively listened to, and the views which accompanied his remarks were quite interesting.

Mining Bureau Museum.

The following are among the recent additions to the collection of the California State Mining Bureau:

Native antimony with stibiconite, Kern Co., Cal.; A. Banc.
Cube of granite (one foot) dressed and polished, from the quarry of the Rocky Point Granite Co., Exeter, Tulare Co., Cal.; Messrs. Griffith, Owens & Hughes.
Bementite, New Jersey; barite-calcite and chondrite, England from J. Z. Davis.
Old-style rocker for gold-washing, Mariposa, Cal.; D. Lawson.
Granite, Mt. Tamalpais, Marin Co., Cal.
Aztec or toltec, heads of baked clay, Miss F. Gates.
Gold quartz (rich in free gold), new locality, Eureka mine, Pine valley, San Diego, Cal.; Mr. Noble.
Crystallized stibnite, Hollister, San Benito Co., Cal.
Three rich gold-quartz specimens from the Idaho mine, Grass Valley—two of them from the rich quartz recently struck 1700 feet below the surface; Edward Coleman.
Silver ore rich in native silver, Venturas mine, Durango, Mexico; W. F. Campbell.
Fine specimens cuprite and azurite; J. Z. Davis.
Twenty-one specimens rare minerals (imported), Eastern States and Europe.
Asbestos from Corsica; R. H. Jones.

MECHANICS' INSTITUTE FAIR.—Secretary J. H. Culver of the Mechanics' Institute says that many applications for space are being received and many inquiries made regarding the coming fair. The board at the last meeting made up the premium list, and a large number of medals and cash premiums will be awarded; it was now in the hands of the printer and will be ready for general distribution soon. The art gallery is to be made an especial attraction, and a large number of pictures not heretofore shown to the public will be placed on exhibition.

COAL MINERS AT WELLINGTON.—R. Dansmnir & Sons have positively refused to meet any committee from the Council of Federated Trades to arrange for a settlement of the troubles existing between the firm and the coal miners at the Wellington coal mines. It is reported that the Dansmnir firm will begin evicting the families of the miners from their homes at the Wellington coal mines on July 12th.

In the High Sierras.

NUMBER II.

Through Bloody Canyon to Mono Lake.

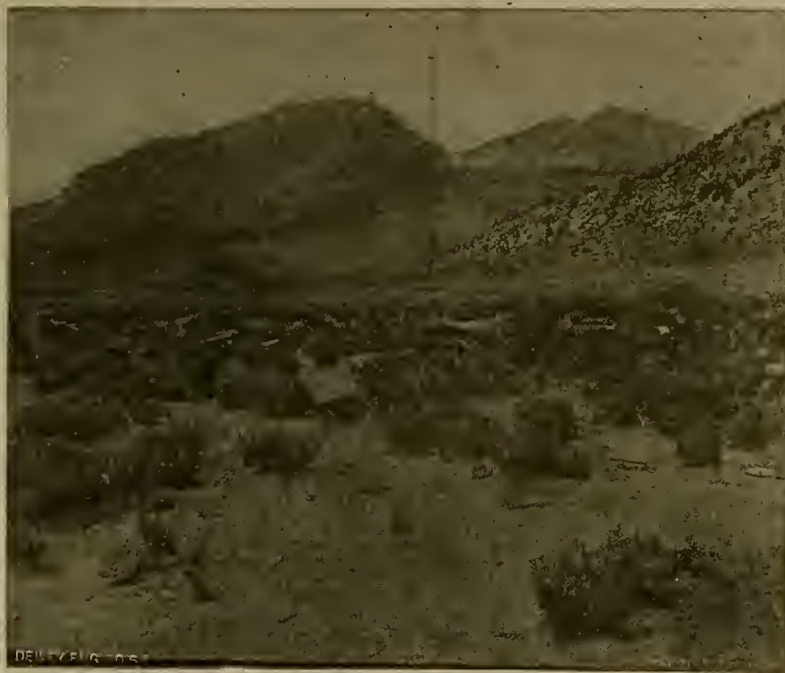
Before the adventurous trip to Mount Lyell (as described in last week's PRESS), the party of students passed through the Sierras to Lake Mono, and returned to Soda Springs. This occupied three days. A conspicuous trail was discovered after they left the camp at the base of Mt. Dana, which led the party to Mono Pass, the entrance to Bloody canyon, which is noted for its steepness and its dangerous trail, its picturesque rock scenery and its floral beauty. In the descent through the canyon to the east the slope is extremely steep, the total length being two miles, within which distance the trail descends at least 2000 feet in vertical height. The trail leads down to the base of the mountain over an old battered-down stairway. Here the trail is rough and treacherous, as the name of the canyon is intended to suggest. At one place the trail turns sharply to the right, and sweeping down a narrow gorge partially filled with loose fragments of slate, suddenly presents an impressive scene. Here they are almost entirely hemmed in by cliffs. A deep, unnatural-looking lake rests serenely in a solid rock basin. Beyond, egress seems impossible, so steep do the walls appear and so narrow the outlet. This is certainly the lake which was gouged out by the glacier that in former ages filled the canyon. Yonder is the cliff over which the ice fell. There can be no doubt about it. This is "Sardine" lake; here is the place where a mule once slipped and fell into the water, and with his load of sardines, was lost. The party was greatly relieved to find the exit less terrible than it had seemed.

"All along the trail, especially near the summit, the rock scenery was brightened by the multitude of flowers which blossomed in

mass of the Sierras had at one time been lifted up as one huge block which had been tilted away a little from us, so as to leave a long, gentle slope on the western and a short, steep one on the eastern side. The picture given on Mt. Dana and Mt. Gibbs, taken from near here, will illustrate to some extent the steepness of the slope." [The photo-facsimiles given in this and the previous article were made from negatives taken by the young assistants of the expedition, and are not quite as

created them was exerted in frequent earthquakes, which, it is supposed, helped to elevate the Sierras. Even now the energy is not entirely dissipated, as is shown by the hot springs which exist on the islands of Lake Mono and the frequent earthquakes experienced in the Basin region.

"We made our camp on Rush creek, and went down to the lake shore just as the sun was setting behind Mt. Dana, and the evening shadows added their weird effect to the dead lake.



MOUNTS DANA AND GIBBS.

we were unable to solve. Here we were in a volcanic region where earthquakes are common. Can we attribute the above phenomenon to a local subsidence of the shore-line or to an elevation of the lake-bed, causing the water to overflow the shore, or is it caused by the gradually increasing humidity of the basin region, tending to enlarge the lake to its former size?"

Redwood Timber.

In the forests of Sonoma, Mendocino and Humboldt counties, in this State, the trees out for lumber average much larger in size than any in the world. These redwoods are not the "show" big trees of California which are in Calaveras, Mariposa, Fresno and Santa Cruz counties, and are of a different variety. But the big redwoods of the northwest coast of the State are utilized for lumber, being cut wherever met in the forest at such points as logging camps are located. Trees eight and ten feet in diameter are not at all uncommon, and many are found from 14 to 16 feet. The very "larges", when felled, are sawed into logs, and the logs split by powder before being hauled to the mill, such sections being too unwieldy to handle readily.

A photo facsimile on page 411 shows a log loaded on the cars for the Navarro mill, Mendocino county, and will give an idea of the size of some of the timber cut in the woods of that region. Some logs are floated down the river during the high-water season, but a railroad has been built 12 or 15 miles into the timber, and on this logs are brought to the mill near the ocean at all times. The engraving is made direct from a photographic negative, so that no exaggeration occurs. The figures in the picture will give an opportunity for comparison of size of log and men.

THE MECHANICS' INSTITUTE.—At a meeting of the Board of Trustees of the Mechanics' In-



MONO VOLCANOES.



RED OR SARDINE LAKE, BLOODY CANYON.

profusion. There were musk plants and wild onions, scarlet and azure pentstemons, gillias white, Gentians purple, and yellow columbines of the most delicate texture and exquisite beauty. About one-half the way down we found wild currants and gooseberries. Here also the first trees began to appear.

"After we reach Moraine lake, about 2 1/2 miles below the summit, our mountaineering is done. There are no foothills beyond worth mentioning. Our course now lies over a burning, sandy plain, as much unlike the verdant meadow at Soda Springs—which is nearly the same elevation—as one can imagine. Coarse, prickly plants of the poppy family, stumpy wild plum bushes and sagebrush characterize the flora.

"The road leading to the lake, about six miles distant, was pointed out. It turned away immediately from the border of the desert and led out into the alkali plain. Looking back toward the Sierras, we were impressed with the general precipitous character of the slopes facing us. It appeared very much as if the

clear as might be the case with negatives taken under more advantageous circumstances.—EDS. PRESS.]

"As we proceeded toward the lake, the heat became more intense and the alkaline and salty dust more provocative of thirst. Vast cycles of change here present themselves. Long ages ago in the history of man, but very recently in geological times, there existed a fresh-water lake 300 or 400 square miles in area, into which the glaciers of the eastern side of the Sierras doubtless discharged huge icebergs.

"Later the volcanoes appeared, and the glaciers gradually retreated, leaving their skeleton arms extending for miles out into the plain. The lake began to shrink in size, and this process was marked by successive beach lines, which are conspicuous features of the landscape to-day. The accompanying cut shows one of the highest, which appears sharply marked against the sides of the volcanoes, over 600 feet above the present level of the lake. After awhile the volcanoes ceased to pour forth their smoke and lava, but the energy which

By long evaporation its water has become so alkaline and salty that nothing can live in it, except the larvae of a certain fly, which swarm in myriads along the shore. These, together with the teeming multitudes of fully developed flies which swarm on the muddy and salt-crusted banks, give rise to a disagreeable suggestion of decay rather than of growth, a feeling which is not relieved by the numerous shrubs just off shore, which have been surrounded by the alkaline water, and now lift their bleached and motionless skeletons as a silent symbol of death.

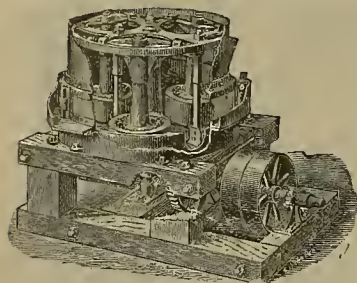
"There are flocks of birds of various kinds attracted by the abundance of flies. But what is most striking, perhaps, is the great abundance of the common sea-gull, which, always considered by us as a scavenger for man, and always associated with him, seems greatly out of place here, where the human face is seen but seldom.

"The presence of the dead bushes off shore presents a question of considerable geological importance, which, owing to our limited time,

stitute, the Committee on Rules and Awards presented a final revision of the premium list, which was ordered to be printed at once for distribution. The various committees were instructed to begin active preparations for getting the pavilion in order, and to push forward all the preliminary work for the exhibition in September. The board authorized Secretary Culver to also act as its general agent during the illness of William Cameron, who is quite sick.

SCHOOL OF INDUSTRY.—The State Prison Directors have, after a general discussion, agreed to purchase the site for the Preston School of Industry at Ione, Amador county, from the Ione Iron and Coal Co., and the water-right from B. and M. Isaacs, provided the deeds and bonds offered are considered satisfactory by the attorney.

The Mint officials are preparing for the annual cleanup and refuse to take any more crude bullion at present. After the 21st of the month fine bullion will also be refused.



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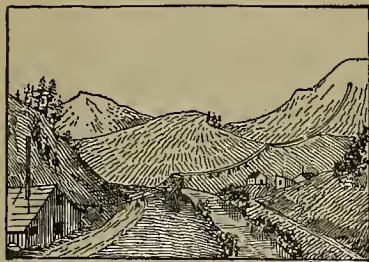
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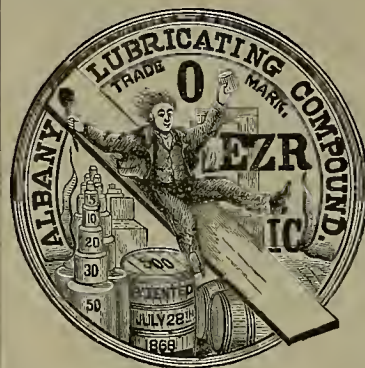
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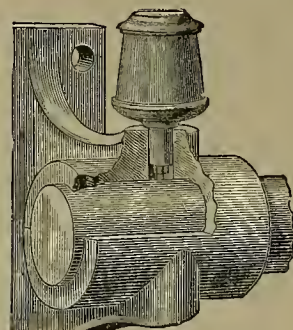
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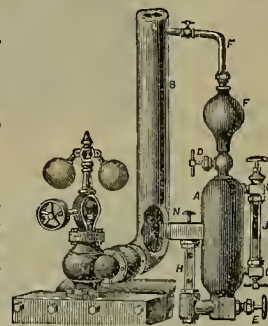
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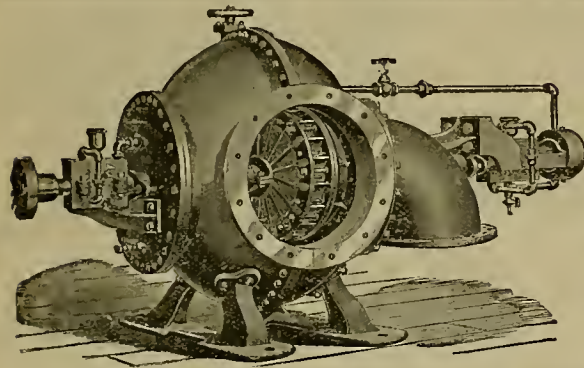
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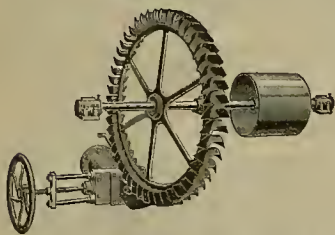
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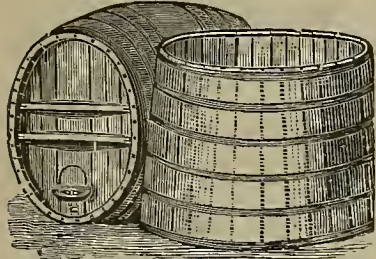
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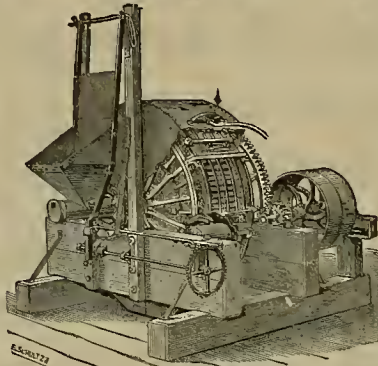
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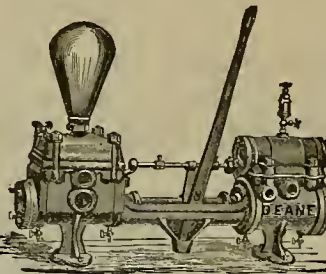
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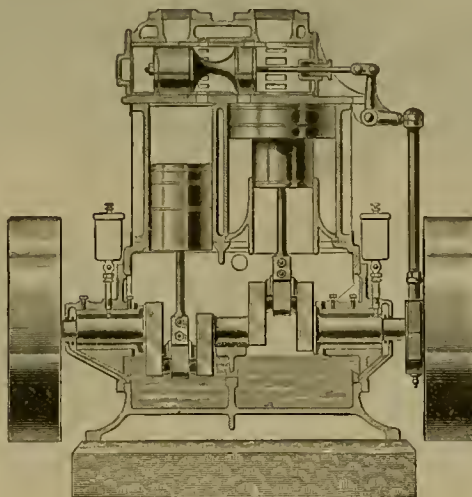
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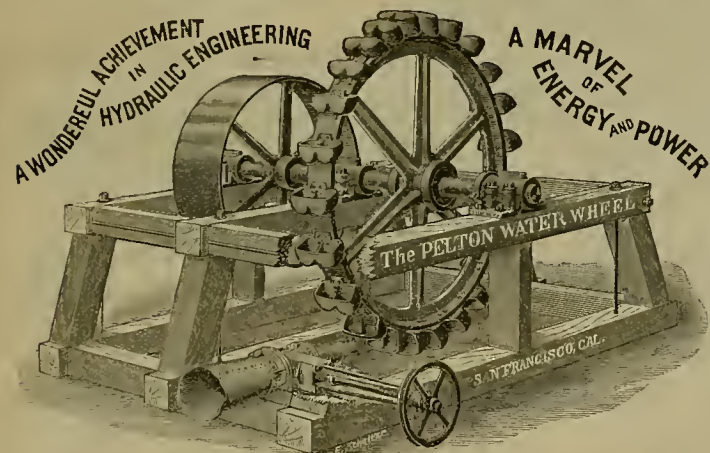
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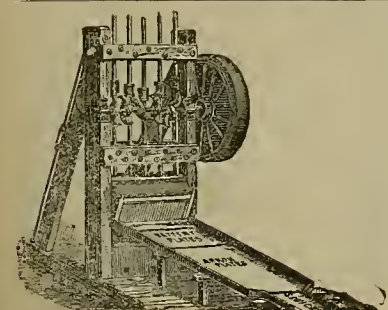
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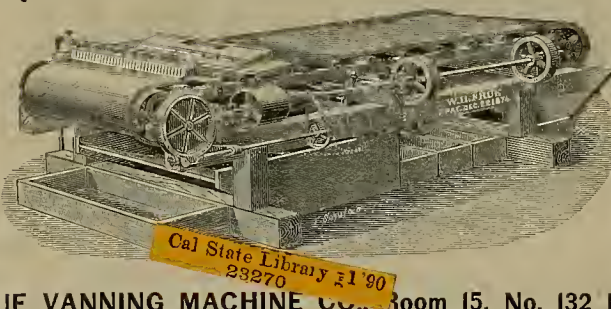
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N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

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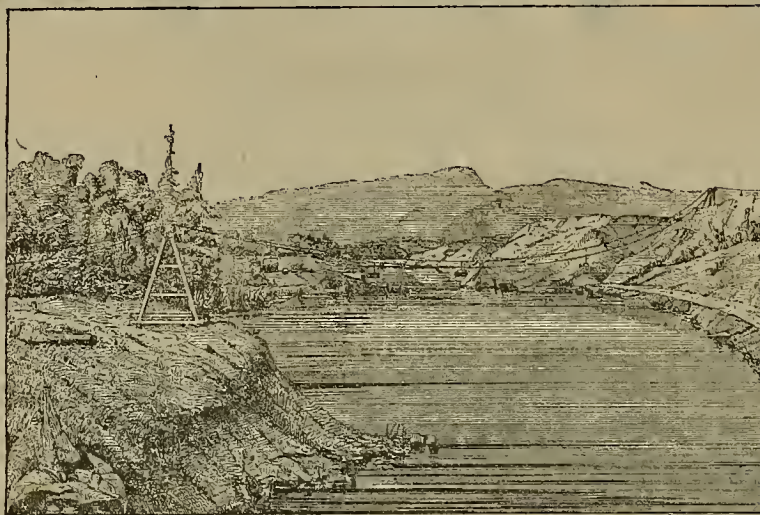
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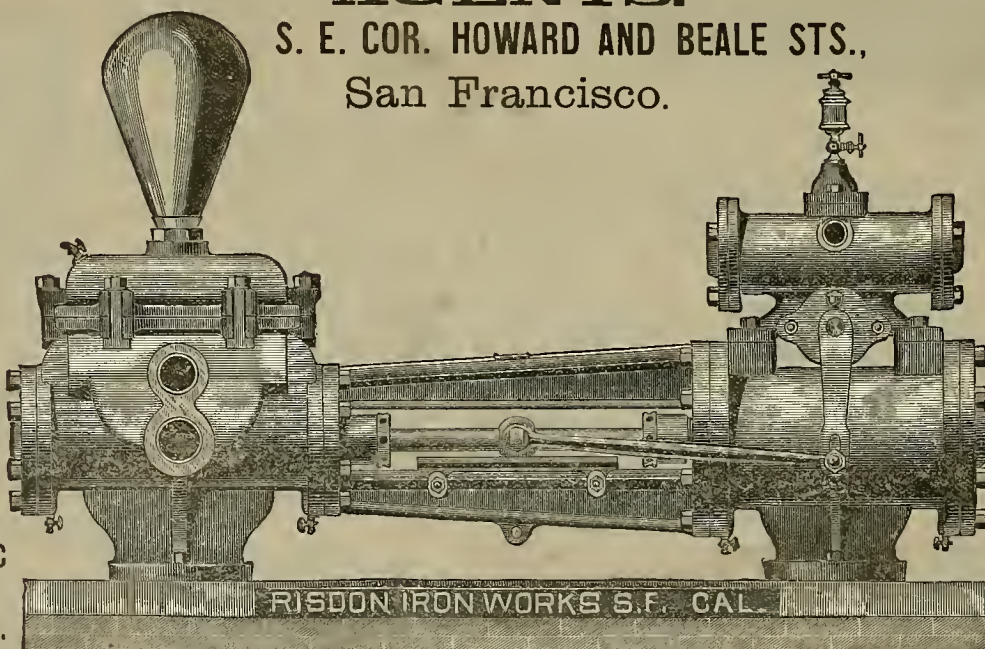
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Cables for Cable Roads.

One of the items of expense in cable roads is the cost of the cables or ropes, and this has become more apparent since so many curves and crossings have been constructed on the increase of cable roads.

The wear on the steel cables is almost entirely

have to be made by a number of comparatively small sheaves placed horizontally—in the line of the curve—when the car cannot be carried around by gravitation. When it can be carried around by gravitation, then a single large rope sheave is employed. The rope is released from the grip and picked up on the other side of the curve. In all cases, however, the wear on the

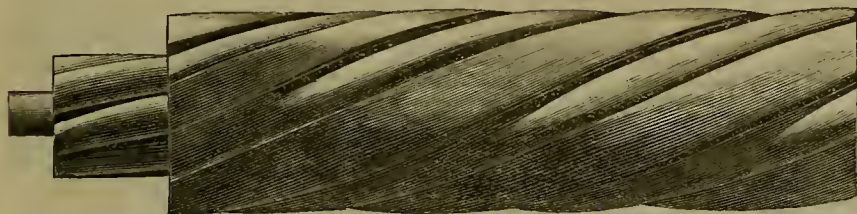
from a point of observation below the conduit and where he can see the rope and grip, can realize the enormous amount of power and heat expended in starting the car, from the stream of fire developed by the momentary slipping of the cable through the grip.

This rapid development of heat means destruction to the cable in two ways; one, by

without such a high quality of steel, the needed tensile strength could not be obtained. The steel wires in the cables of these cable roads are required to have a tensile strength of about 200,000 pounds per square inch of surface.

The question of increasing the durability of such cables has received the attention of Mr. A.

FIG. 1.



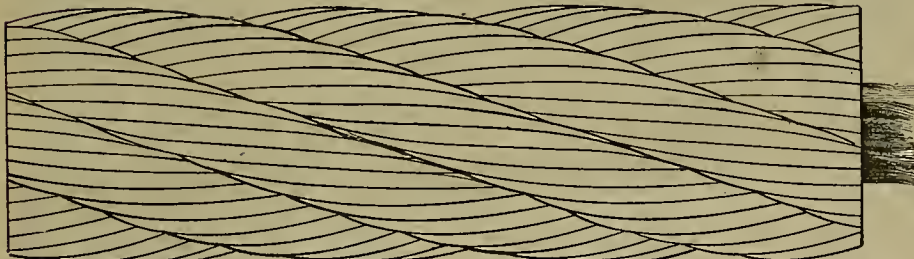
STRAND OF HALLIDIE'S IMPROVED TRACTION ROPE FOR CABLE RAILWAYS.

FIG. 3.



HALLIDIE'S IMPROVED TRACTION ROPE FOR CABLE RAILWAYS.

FIG. 8.



ORDINARY TRACTION ROPE OF ROUND WIRE—NEW.

FIG. 10.



ORDINARY TRACTION ROPE OF ROUND WIRE—WORN.

ly due to the contact of the cables with the grips and sheaves, and to the sharp bends over sheaves of small diameter. The employment of sheaves of small diameter should be avoided wherever it is possible, but in some cases, of crossing another cable line, this cannot be entirely prevented. The cables belonging to the younger cable railway company have to pass below that of the senior company, and this is done by dipping under the conduits, the cable being depressed by rope sheaves.

Again, in passing around corners, the turns

cable is almost entirely from abrasion, and the projecting part of the wire becomes worn down to a flattened surface. The wear for the first few days on the exposed wires of a new cable is very rapid, and the wires soon present a section such as is shown in Fig. 6 of the accompanying illustrations, when originally it was perfectly round as in Fig. 5. The strength of the wire is thus reduced in proportion.

Any one who has taken the trouble to watch the effect of starting a loaded car on an incline,

the grinding off of the projecting portions of the individual wires by abrasion, as already explained, and the other by the heat transmitted to the highly carbonized steel wire, to be rapidly cooled off in the cold atmosphere or dampness, and thus raised to a hard temper which destroys the toughness of the wire, causing it to break like glass.

It may be said, why use steel wire subject to such facility for taking temper, and why not use a much milder steel or a quality of iron like Swedish or Norway? The answer is that

FIG. 2.

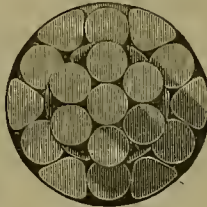
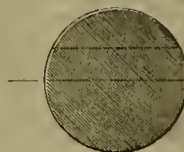


FIG. 5.



PERFECT WIRE.

FIG. 6.



WORN WIRE.

FIG. 4.

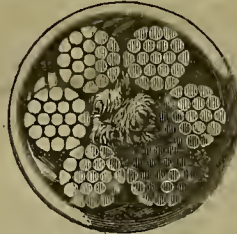


FIG. 9.

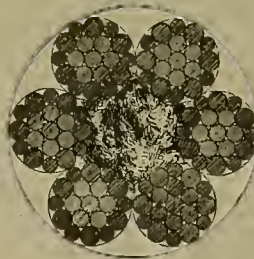


FIG. 11.

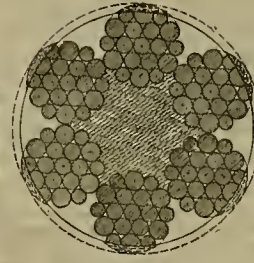
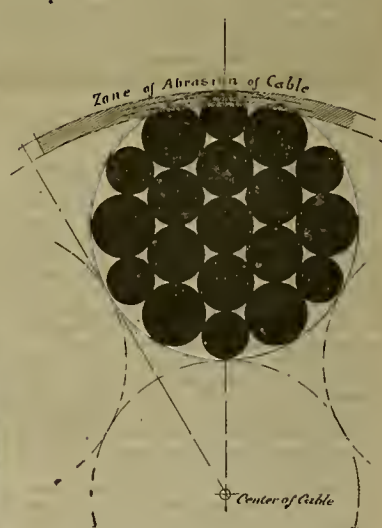


FIG. 7.



WORN STRAND OF A ROPE.

S. Hallidie, the inventor of the cable system, who has for some years past carried on some practical experiments to obtain better results and with considerable degree of success.

In this he has had the co-operation of the California Wire Works and the cable roads of San Francisco, and the record of the life of such cables has shown durability increased from 15 to 30 per cent.

These cables are usually made up of six strands, each having nineteen wires—a center wire covered by six and the six again covered by 12, making 19 wires in each strand—and are technically called "flexible wire ropes," and it is essential that they should be sufficiently flexible to bend over the numerous sheaves and galleys on the line of the road. The outer wires being in contact with the sheaves and the grip, and oftentimes rubbing over the ground, are soon abraded and a large proportion of the wire worn off.

In order to protect the wires against the effect of such abrasion, Mr. Hallidie has, after considerable experimenting, so far modified the form of the cables as to reduce the wear on the wires and the liability of becoming hardened and tempered to a very considerable extent.

(Concluded on page 435.)

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

Mines Around Glendale, Montana.

EDITORS PRESS:—The outlook for mining developments about this vicinity in the immediate future seems bright. The Hecla mines are working the usual amount of men. Although but one stack is running in the smelter here at present, the other—now shut down for repairs—will be in operation soon. The roaster is also undergoing repairs and will be started up immediately.

The Wake Up Jim mine, between Greenwood and Hecla, is apparently going to become a valuable property. At one time it was the property of the Hecla Co., but not being patented, it was forfeited through a misunderstanding and is now the property of Messrs. Bradford & Conway. It is under a bond and lease to other parties, who have struck a fine body of ore above water level. This ore is being taken out and shipped to Anaconda for treatment, the second class ore paying all running expense of the mine, leaving all the first-class net profit.

Vipond district is now creating great interest, especially the Quartz Hill portion of the district.

Helena and Butte capital is anxiously seeking investment there and middlemen have bonded and leased a great many prospects.

The impetus to the stir was given by two strong companies taking hold as if they meant to stay. First is the Lone Pine Co., operating the Lone Pine mine, for which we learn they paid \$60,000. After staking a winze about 90 feet below the old workings, their brightest hopes were more than realized by the development of fully nine feet of a much higher grade ore than had ever been found in the mine.

The walls of the vein are apparently still diverging, so the width it may attain may yet be more surprising.

The vein was very flat on top and lay like a blanket along the northwest side of the gulch. But as it approaches the middle of the gulch, it inclines more rapidly to the vertical.

The company has stopped taking out ore, as there is plenty on the dump to run the mill for some time yet. They have put three shafts on the new shaft immediately across the gulch to tap the vein below the winze. On June 7th, the shaft was down 54 feet. It is a fine 4x9 shaft, well and nicely timbered, and partitioned for ore and manway. The building is partly finished and the hoist being moved in.

Mr. Thompson, the foreman, is doing all in his power to rush the work along, and expects to tap the vein at a depth of 100 feet, when a full force of men will be put in the mine to extract ore.

The second mine of importance at present is the Patengale, owned by the Jay-Hawk Co., English capitalists, who, we are informed, bought the property last fall for \$25,000, and have put up a fine steam hoist. They use air compressors for Barleigh drills. The shaft is down 155 feet, and levels run. The vein is eight feet wide, and the quality of the ore improving rapidly in the bottom. They are working 13 miners and several hands, and putting up a fine stamp-mill at Dawy's Flat.

The Handy Andy mine is a small, rich vein near the Patengale, owned by Mrs. Liggett of Butte, and is under a lease to the Panky Brothers from the same place. These gentlemen are shipping the highest grade ore in camp. The mine is working six men and developments this spring are very successful.

Nicholls & Cable, real estate agents of Butte, have secured a bond and lease on many claims, among which are the following: Claims owned by J. Kilkenney et al. on which they are working two men. Also the Aerolite, owned by William H. Brown, bonded for \$5000; lease expires in three months. Two miners are at work developing this immense ledge. The footwall only has been found, and the vein is supposed to be 75 feet wide. The ore is very spotted on top, but one boulder of float, broken up and shipped, yielded $3\frac{1}{2}$ tons that milled $4\frac{1}{2}$ ounces of silver per ton. Some ore in the shaft has assayed 53 ounces. Should this ledge improve with depth as others in the district have done, we may look for a million-dollar bonanza. It is situated about two miles southerly from Quartz Hill. Within a few hundred yards northwesterly from it Mr. Brown owns another vein, smaller but much richer as far as developed. A shaft is sunk 60 feet and levels run 50 feet each way, easterly and westerly. The vein shows from two to four feet of rich ore. The first class milled 83 ounces silver, and second class 25 ounces. Over 100 tons of ore have been milled from this mine, the name of which is Tuxedo.

About $1\frac{1}{2}$ miles southerly from Mr. Brown's property are the well-known Vipond bonanzas, lying idle at present, but as Mr. Vipond has returned from the East, it is hoped he will take the developing fever now raging in the district and do something.

Mr. Joseph Sturm has two fine prospects near the above, on which he has worked hard all winter, and his labors have been crowned with success. The improvements in his ledges have surprised himself as well as others, and we are informed that the property which he offered for a few hundred dollars only about a year ago he now asks \$20,000 for.

Three mines about Quartz Hill, owned by the Gelbreth Bros., are bonded for \$15,000, but

work thereon is continued by the present owners.

The Banner mine is leased to Mr. Green, who is working three men.

The Faithful is an immense ledge about one-half mile westerly from the Vipond mines, which several parties have examined with a view to lease or purchase, but as yet we believe it is idle.

In addition to the above, many other prospects have been more or less developed during the past winter and spring, and with very encouraging results.

We do not look for a boom, as many do, in Vipond district during the present season, but should the prospects now being developed prove as good as those already partly opened up, we will undoubtedly have a first-rate camp within two years hence. B.

The Mines of Amador County.

NUMBER II.

[By Our Own Correspondent.]

Knight's Iron Works, Sutter Creek.

The water-wheels and mining machinery of these works go into every mining section and the works are well known in consequence. At present Mr. Knight is building a combination hydraulic engine and pump for the Kennedy mine. This machine is to be placed at the 1250 level. It will take its water-power from the mine's water at the 500-foot level, which will be conducted down to the engine by pipe.

The water that supplies the engine is exhausted into the pump column and flows to the 1050 level with the mine's water pumped, and there discharges into the 1050 level and flows to the No. 3 shaft, where it is hoisted by bucket. In time a hydraulic pump will be put at this shaft. This pump economizes space and uses the mine's water for power. Mr. Knight has put in two of his hydraulic pumps at the Plumas Enreka mine, Plumas county, one at the Wildman, Sutter Creek, and one at the Marguerite, Sierra City, in addition to this combined pump and engine for the Kennedy.

Amador Reduction Works.

Voorhes & Barney are the proprietors of these works which are located midway between Sutter Creek and Amador City. These works have been in operation for 17 years, and are the most complete, if not the largest, in the State. They are also the owners of the Patengale Reduction Works at Drytown (Amador county). The Amador works have a capacity of three tons a day. Ores are bought on the assay value, and an average of 92 per cent of assay value given, and \$20 a ton charged for treatment. The concentrates from the ores of the mines in the county carry an average value of \$100 a ton.

Amador City.

The South Spring Hill, J. R. Tregloan superintendent, is opened to a depth of 800 feet. Two shafts have been put down—one for working and the other as an air-shaft. The vein is ten feet in width of \$10 ore, with two per cent sulphurets. The mill has 30 stamps, 10 Frue and 2 Triumph concentrators. Fifty electric lights of 20 candle power each illuminate the works. The able superintendent wisely suggests that all mines should use the electric light, as the water or power which runs the rock-breakers during the day is not used during the night. This water can be utilized to first run the dynamos and then dropped into the batteries, thus furnishing the electric light at no expense other than the cost of the plant.

The Talisman, J. R. Tregloan superintendent, has a shaft down 900 feet and is now being reopened and put in working order. A ten-stamp mill will be erected this season. Crushings at various times give an average value of \$5 a ton.

The Keystone.

This mine is opened to a depth of 1600 feet on the vein. The vein has run from 1 to 100 feet in width. At this time they are drifting on the 1600-foot level, with every indication of striking a good body of ore. This mine supplied 20 stamps with ore for 18 years and 40 stamps 28 years, crushing $2\frac{1}{2}$ tons to the stamp of ore averaging \$15 a ton. The sulphurets average $1\frac{1}{2}$ per cent and run from \$100 to \$200 a ton. The ores are concentrated by Hendy concentrators and the tailings run over Morris canvas tables.

A Mine-Timber Framer.

At the Keystone, Mr. Isaac Lopley, the company's machinist, has a machine for framing mining timbers. This machine frames all four sides of the timber at one operation without moving the timber, and cuts to any desired length or angle, doing the work of 12 men with that of one.

The timber is fastened on to a movable platform. With a hand-lever the operator brings the timber forward; another lever sets the cutter in motion. This is placed on a movable mandrel mounted on a carriage. The cutter, revolving like a planer, passes up one side of the timber, then across, down on the opposite side and back underneath the timber. The cutter is readily raised or lowered and the carriage moved backward or forward, as desired. This is a valuable machine where large numbers of timbers have to be framed. The Keystone Co. use 11 of Mr. Lopley's water-wheels on mine and mill. One 60 and one 62-inch circular saw are run direct, the water-wheel

being placed on one end of the shaft and the saw on the other, giving the power direct without the use of pulleys or belts.

Bunker Hill.

This mine is operated by a Philadelphia company, Mr. John Myers superintendent. Their north shaft is down 800 feet; the south shaft 400 feet. The vein runs from 2 to 20 feet in width. The ore carries 3 per cent of sulphurets, running \$60 to the ton. These concentrates are worked in the company's chlorination plant, which is of two-ton capacity. The revolving barrel process is used. They find this method more economical and to save a larger per cent than the usual chlorination process. The superintendent kindly remarks that whoever tries the process must be sure of the quality of the chloride of lime employed if they would be successful. The mill has 40 stamps, crushing $2\frac{1}{2}$ tons to stamp, and 16 Frue concentrators.

The Gover.

The north shaft on this mine is down 1000 feet; the south 700. At this time they are working the 300, 500 and 600 foot levels. The vein runs from 6 to 20 feet of ore averaging \$15 a ton. The ore carries 2 per cent of sulphurets. The mill is of 20 stamps with Woodbury concentrators. J. Call is superintendent.

Plymouth.

The Cosmopolitan, W. S. Weymouth superintendent, is $1\frac{1}{2}$ miles south of Plymouth. The shaft is down 750 feet on an eight-foot vein of ore carrying $1\frac{1}{2}$ per cent of sulphurets. The mill is equipped with 30 stamps, two Triumph and twelve Frue concentrators. The owners are Bostonians.

Reavee.

This property is one mile south of Plymouth. The mine is worked by tunnel and open cut. The vein is 25 feet in width on the surface. The ore is quarried out, shot down into the cars in the tunnel and run into the 20 stamp mill. The vein matter averages \$1 a ton in value, and is mined and milled for 75 cents a ton. K. T. Crocker is superintendent.

New London.

H. Reese is superintendent of this property. It joins the Pacific on the south. The company sank 1340 feet on the vein and drifted 600 feet before erecting a mill. That takes "sand and soap," and is an example worthy of imitation. If we had more of it and less expensive and extensive plants, built on prospects, the mining industry would not be looked upon as risky. The vein runs from 3 to 15 feet in width. The company has just erected a fine 40-stamp mill with 16 Frues.

Plymouth Con.

W. T. Jones of the old Eureka of Sutter creek is superintendent. The company is working the Pacific. The old workings from the third to the seventh level all caved in consequence of the fire. The shaft remained intact. These five, six and seven levels were drained out, but the great amount of water in the past winter caused them to refill. The levels will be allowed to settle before they are reopened and worked.

The mine is now being worked on the 300-foot level. The vein is open to a depth of 1620 feet. There still remains intact 700 feet on the south end of the Pacific and 1200 feet additional adjoining on the Indiana. The mine is in a new body of ore south. It is looking well, but is not sufficiently developed to prove its character. Should it prove good, the mill—80 stamps—will begin running. At present 40 stamps are running. The company mine and mill for \$2.75 a ton.

With the exception of the mines northeast of Jackson, all of the mines that I have written of are on the mother lode. The mother lode with its great length, strength and gold value, is too well known to need any description.

Gravel Mines.

The Telegraph Hill mine is six miles east of Amador City. The mine is an old river channel that extends from this point to Volcano. The gravel is under an old lava ridge. A tunnel 500 feet long has been driven to cut the channel and will be in this season. Very heavy gold and large quantities of it were taken from this property when worked by the hydraulic process. Messrs. Keeney & Stetzer of Amador are the owners.

Water Supply.

The mines and mills of Amador Co. are all run by water-power. The water is furnished principally by the Blue Lakes Water Co. The company takes their water from the North Fork of the Mokelumne. The ditch takes out 2500 inches and delivers 2000. The system covers all of the lower part of the county. Water for mining purposes is sold at 20 cents an inch; for irrigation, 12 cents for 10 hours. Recently a company have incorporated to furnish San Francisco with water from the Blue lakes. This, the Blue Lakes Water Co., will form a part of that system. The mountain portion of the county is covered by the McLaughlin ditch, formerly known as the Jackson.

While the Amador Ice Works cannot be called a part of mining operations, the fact that this company, with their three-ton in 24 hours output with a Stevens machine, are furnishing the citizens of the county with ice for $1\frac{1}{2}$ cents a pound, is cooling to think of by those contemplating a summer visit to Amador. In conclusion, I would add that the mining men of Amador are gentlemen, and the visitor can depend upon a cordial reception and kind treatment. E. H. SCHAEFFLE.

The Gold Belt of Northern California.

Ancient River Channels and Gravel Deposits.

NUMBER III.

[Written for the MINING AND SCIENTIFIC PRESS by JAMES F. TALLEY, Shady Run, Placer Co.]

On the Middle Fork Divide.

In regard to the gravel deposits, I will follow up the line of illustration of this theory on the Middle Fork divide.

The invariable operation of natural laws throughout the universe must be admitted, and under the operation of those laws, causes that produce certain effects in one locality would, under like conditions, produce the same effects in other localities, however remote. This is as true in regard to all of those gravel deposits that have been formed since the commencement of the volcanic period as in any other operation of nature.

The process by which those gravel deposits were formed was apparently very simple and natural, and commenced in the gold belt, after the Pliocene river channels were dammed up at some particular point, and continued to the end of the epoch. Where a dam is formed in a large river of sufficient strength and with material that will resist the pressure and force of the water above, it is obvious the accumulating waters must have an outlet.

To illustrate the principle, we will suppose an extensive volcano burst out at the head of the North Fork of American river; the lava would as naturally flow down that river as the water. In the course of time the lava would form a complete dam, from crest to crest, at Cape Horn. On the south, Indian and Shirt-Tail canyons, and on the north, Bear river, heading high up on the ridges, would be free of lava. The badrock country around this lava dam being less resistant would give way at some low sag on the south, toward Indian canyon.

Any person with a vivid imagination who has witnessed a cloudburst or an immense reservoir break may have a remote miniature idea of the process and "catch on."

Where this break is supposed to occur, there is a grade from the ridge to the bed of Indian canyon, of 1000 feet within a mile. As the break becomes deeper, the propelling force is increased and great masses of big boulders and heavy material are carried down by the steep grade and deposited on the bottom where there is less grade, until the erosion above and filling in below equalizes the grade, so that the same quantity of water would carry nothing but the small gravel and light material, such as is found in the top strata of the existing gravel deposits.

Here then we would find a gravel deposit where Indian canyon was corresponding in every detail with the deposits seen in the hydraulic banks of to-day.

The illustration might be extended. While this modern channel followed the course of Indian canyon to the westward, a big slide might occur and change its course to the southward, where it would find a dumping ground in Shirt-Tail canyon and there form another gravel deposit. It will be observed here that this cutting out and gravel depositing process is going on during the intervals between the lava flows, which are known to be at irregular periods. When a lava flow takes place after those gravel deposits are formed, the break in the rim that let this gravel out, being too small to carry the large quantity of lava, the result is, the gravel deposits are partially capped and the break completely blocked up. A similar break might occur to the north toward Bear river, and under the same conditions would produce like results. It was by these methods that

The Modern Channels and Basins

Were cut out and filled up with boulders and gravel. Only on this principle can we account for the numerous channels in the same locality running in opposite directions and gravel deposits many miles apart, having a common source.

In accordance with the foregoing views, then I assume that all of the gravel deposits between the North and Middle Forks of American river, within the gold belt, comprise one independent system and have one common source from the ancient river channel in the Middle Fork divide. It would not accord with the natural order of things for two or more Pliocene or ancient rivers to run unobstructed in close proximity in a mountain region like this. I conclude, then, that there was but one ancient river and its tributaries ran in this divide at the commencement of the volcanic period, and that its obstruction and entire obliteration can be traced directly to the lava flow as the prime cause during that period.

Taking a Practical View

Of the whole subject, aside from geological theory, it must be obvious that the entire slope from the summit of the Sierras to the sea, and from the lava beds in the North, several hundred miles to the South, was involved in the great revolution by which a whole grand river-system was obliterated and a new one established.

From the standpoint on some high lava ridge

in the gold belt, the various existing conditions are accounted for.

The indications are that the volcanic period was ushered in by some great convulsion that gave existence to the coast line range of mountains, and sunk the intervening region between this range of mountains and the Sierra Nevada, a thousand feet below sea level. To account for the varying conditions observed throughout a large extent of Central and Northern California, in regard to this subject, the country between the coast line of mountains and the summit of the Sierras may be

Divided into Five Sections.

Each one distinguished by conditions as peculiar and marked as if separated by a mountain range, but still holding inseparable relations with each other with reference to the final result.

1st. This section includes what is now the Bay of San Francisco, the Sacramento and San Joaquin valleys.

2d. The lower foothill country, extending from the valley to an altitude of about 1500 feet ("the citrus belt").

3d. The upper foothill country; this section includes the country between the "citrus" and gold belts.

4th. The gold belt.

5th. The mountain section extends from the gold belt to the summit of the Sierras.

In regard to the first section, it must be obvious that the sinking or subsidence here accounts for the change of level, and from the immense deposits of gravel—from 500 to 1000 feet deep—in these valleys below sea level, we conclude here is the center of the great depression, toward which the subsequent erosions converge.

This change of level effects a two-fold purpose, in giving the opportunity for erosion in the higher sections, and forming a vast dump for the material brought down.

Whether these gravel deposits were brought down by the ancient or modern system, or not, is immaterial. The indications are that the lower foothill country was not materially affected, except by having the lower portion submerged by the accumulating waters in the landlocked section below.

These ancient rivers had been dumping their golden gravels along this lower foothill section much in the same way that tailings are dumped from the flume of a hydraulic classifier, filling up depressions, blocking up in one place and cutting out in another, thousands of years before the Volcanic period was ushered in. It appears the flow from the first eruptions consisted, principally, of mud and slinkens (similar to the material emitted from a volcano recently, in Japan). Immense quantities were emitted before the lava began to flow to any great amount, filling up the ancient channels in the gold belt, in some places a mile wide and 200 feet deep, and following those channels down to their dumps in the lower section, miles in extent, to a considerable depth, was deposited in the valleys. In the gold belt this material generally overlies the bottom pay deposit in the ancient channels, and by most miners is called "mountain cement." In the valleys the same material from the same source is termed "hardpan."

It is evident that at some period of time the water covered the lower foothill section to an altitude of 400 to 500 feet above the present sea level.

That the Stationary Sea

Ever attained an altitude of 500 feet along this foothill section is improbable; and this condition is accounted for in a more natural and reasonable way. By the uplift of the Coast Range from 500 to 1000 feet above the sea in a continuous, unbroken line, all communication between the sea and this inland depression was cut off. Under these conditions, it must be obvious that the drainage-waters and detritus, from 300 miles in extent on the west slope of the Sierras, would in time form a great landlocked sea, whose waters would rise along the foothill section until they reached some low egress in the Coast Range, and there out an outlet down to sea level. We can see to-day where this low egress was. The changed conditions here are more remarkable, if possible, than in the gold-belt section. The erosion at this sag has given us the world-renowned Golden Gate through which the largest ships afloat can securely pass into the largest and finest harbor in the world.

The transformation was not complete till the waters of this great inland sea had subsided, through this outlet, to sea level, and left us two majestic rivers—one from the north, the other from the south—the Sacramento and San Joaquin, with their extensive valleys, containing thousands of acres of the richest lands the sun shines upon, made from the detritus and eluvials from the high mountain sections. If this theory is correct, the point of elevation where this outlet commenced cutting away at the Golden Gate will determine the high-water line along the lower foothill section and account for the extensive subaqueous gravel deposits observed in the valley section.

The Changed Conditions

Have been outlined and accounted for in the valley section. Its important relation to the other sections is apparent when we consider the vast dump formed for their outlets and the advantage given for modern erosion.

As before stated, the indications are in the early stages of the volcanic period the flow consisted chiefly of mud and ashes which only

filled up and widened out the enolent channels in places; then afterward the lava and heavy material was carried down at intervals, and where the conditions were favorable formed permanent dams, blocked up the rivers and diverted the waters into some lateral depression or tributary unaffected by the lava, and by this method, from the change of level, commenced the modern erosion.

(To be Continued.)

Water on the Pacific Coast.

Contamination in Storage Reservoirs and the Palliatives Resorted to.

(Concluded from last issue.)

Troubles in the Pipe System.

A careful study has been made of the quality of the water as delivered to consumers.

First—The San Francisco supply is derived from six different sources, all told, and consequently when the waters in any given storage reservoir become too turbid for use, they are enabled to shift the supply from one source to another, less affected, and thus to a large extent avoid delivering muddy water to consumers.

As soon as the rains cease, the water in the reservoirs clarifies rapidly, and in the course of three or four weeks becomes quite clear, and is very good in quality. About the first of June, however, offensive odors begin to develop in the supply to consumers in San Francisco, but nothing comparable to that experienced by consumers in Oakland. A careful examination made along the conduits from the reservoirs to San Francisco established conclusively an important fact, namely, that while the waters in the storage reservoirs were very bad, fully as bad as the waters in the Oakland storage reservoirs, yet as we advanced along the conduits it was observed that at all the open flumes and aqueduct tunnels, where the flow of the water was exposed to the air, the quality of the water continued to improve progressively, until finally, when it reached the vicinity of the service reservoirs, within the city limits, the quality was at all times very much better than the surface waters in the storage reservoirs whence it came, and consequently incomparably better in quality than the water delivered in Oakland.

The experience in Oakland is quite different, and deserves careful consideration.

Change in Water at Oakland.

Second—During the winter and spring months the surface-water in the reservoirs is allowed to run directly into the supply pipes, sedimentary matters due to storm waters included. As a natural result, more or less sedimentary matter is deposited in the pipe system and quite extensively in all the dead-ends and fire hydrant branches, in fact everywhere that circulation is poor or bad. During winter storms much of the finer loamy sediment finds its way to the faucets, and gives rise to universal complaint. As soon as the rainy season is ended, however, the water improves rapidly and for a certain period in the spring is clear and really very good.

The supply continues to be reasonably good until about the middle of May, when disagreeable odors begin to develop, and especially when water is drawn from the hot-water faucets the odors are excessively offensive. A very important fact should be noticed here, that this offensive stage in the pipe system precedes by one month the same period in the reservoir, and furthermore, the most common-place kind of test, as well as chemical analysis, show conclusively that during the entire putrefactive stage in the reservoirs, the water in the pipes supplied to consumers in Oakland is always very much worse than the surface water in the reservoirs whence it came.

Direct examination shows that the true explanation of this fact may be traced to the deposit of filthy mud in the pipes, which is undergoing putrefaction (similar to that which subsequently takes place in the reservoir on a grand scale), but under infinitely worse conditions, from the fact that it is confined in the pipe system and excluded from contact with the air.

About the middle of June putrefaction begins in the reservoir, and as a result a fresh supply of decaying remains of vegetable and animal matters enter the supply main, thus adding new fuel to the fire and increasing the evil.

Experiments show that these two sources of contamination are sometimes so active and potent that the temperature of the entire water supply to Oakland is affected thereby. About the 1st of September, 1889, the Water Company began putting in new cloth screens, six thicknesses being used instead of two, as heretofore. A close watch was kept on the temperature of the water in the street mains, and in less than four days following their introduction, the temperature of the entire water supply, some 5,000,000 gallons per diem, had dropped from 72° Fahr. to 65° Fahr., and then continued at the latter temperature for the remainder of the month.

An examination of the mud in the pipes shows what might be expected, that it is of the same composition as the bottom mud in the reservoir, and also that during the putrefactive stage is very offensive, and contains active red worms.

Palliatives Resorted to.

Any one might naturally think after reading the above, that sand-filtration would be the

proper remedy to apply in order to improve the water during the summer months. A little reflection will show that the physical conditions are such as to render it impracticable. That is to say, the quantity of vegetable and animal matter in the water in midsummer is so great in amount that it would clog a filter-bed completely in a very short time, and it would consequently cease to work until cleaned. Hence it is interesting to know what is practicable under existing circumstances.

San Francisco Water Improving.

Nothing is done at the storage reservoirs to improve the quality of the water before entering the conduits. The water first passes the fish-screens and thence through open flumes and aqueduct tunnels, and finally through wrought-iron pipes to the city. At the outlets where they empty into the several service-reservoirs, is located the so-called screen-house, where the water is made to pass through a system of cloth screens before it is allowed to empty into the service-reservoirs. These cloth screens are constructed as shown in Fig. 1, page 435. The sash-frames are six feet long and two feet wide. Brass wire netting is tacked on, and over that is stretched a good quality of cotton cheese-cloth. In midsummer, when the water is foul with animal and vegetable matter, the screens clog rapidly and have to be removed and clean ones put in their place. The fouled screens are taken to the wash-room, where they are thoroughly cleaned, and the foul wash waters are allowed to escape by a suitable drain-pipe to the bay. Each one of these screen-houses requires the constant employment of double shifts, four men 12 hours each, raising, cleaning and replacing the screens, some 300 being required for each house. Generally the water passes through two screens. When it becomes necessary to make a change, the outer screen, being little fouled, is removed first and a clean one quickly put in its place; the inner, or fouler one, is next removed and a clean one quickly put in its place. This screening apparatus is unquestionably very efficient in its way, but, as will be seen further on, it does not touch the fundamental seat of the chief trouble, which lies in the storage reservoirs. It should be mentioned that these service-reservoirs have a division wall through the center, thus enabling one-half to be emptied and cleaned while the other is in use. In summer this requires careful attention.

The Method at Oakland.

The water supply at this city adopts a different method, in some respects, and it is interesting to know that the results obtained are much less satisfactory. Here the screen-house is placed at the storage reservoir, instead of in the city limits, and distant some 9.5 miles. Two varieties of screens have been in use, both identical in principle. Those introduced in 1879 are best shown in detail by the accompanying drawing (Fig. 2) with descriptive notes thereon. Those used in 1889 differ only in design. The foul water is made to pass through six thicknesses of cheese-cloth wrapped around wire cylinder, and the screening process is necessarily more efficient. This system is shown in detail in Fig. 3, page 435.

The screened water passes into a clean-water basin, capacity about 2,000,000 gallons, which is not covered. The hot summer sun has developed a large amount of vegetable growth in this basin and a second one has thus been built, thus enabling one to be emptied and cleaned when occasion requires it.

The screened water from the basins passes into the 37½-inch supply main, and travels slowly to the city of Oakland and direct to the consumers, there being no service-reservoir.

Results Accomplished.

In the case of San Francisco, the quality of the water delivered to the consumers throughout the year may be characterized as reasonably good, and as a rule complaints are seldom made and can always be traced to some local temporary cause. In the case of Oakland, however, the entire water supply delivered to consumers during winter, summer and fall, is always bad, but is reasonably good in the spring. In the summer and fall of 1889, when the water in the storage reservoir got very low, a large number of citizens ceased to use the water either for potable or culinary purposes. They organized a company and brought spring-water from the hills at considerable expense and inconvenience.

This extraordinary difference in the quality of the water naturally calls for an explanation. After studying over the existing facts, I have come to the following conclusions:

First—Experience at San Francisco shows that the quality of the water is greatly improved by flowing through open flumes and aqueduct tunnels before it reaches the city. On arriving at the service-reservoirs, the water is further improved by passing through cloth screens, and thence passes into the distributing reservoir, and soon reaches the consumers before secondary deterioration in the pipes has had time to develop.

Second—It is clear that the Oakland Water Company made a mistake in placing their screening apparatus at the storage reservoir. I sampled the surface water in the latter and found it to be reasonably good; then I sampled the screened water near by and found it to be much better. This screened water entered the supply main, and thence travels a distance of 9.5 miles to Oakland consumers. Experience shows that the quality of the water delivered is always worse than the water in the storage reservoir.

This secondary deterioration is unquestionably due to the putrefactive fermentation in the pipe system. The water company now proposes to build a 150,000,000 gallon settling-reservoir within the city limits, and then transfer the screening apparatus to the same site. I have no doubt but that these new works will improve the quality of the water considerably.

These systems of cloth screens, when properly managed, have certainly proved to be quite effective, as far as they go, but they do not, in my opinion, strike at the fundamental seat of all the worst troubles. This conclusion is based on the results of a long series of observations, which have been under way for four years, and are still going on. They show conclusively that the main trouble from contamination in midsummer is primarily due to the fermentation and subsequent putrefaction of the immense deposit of oozy mud in the bottom of the reservoirs. Hence the experience on the Pacific Coast goes to show, that generally speaking, the older the storage reservoir the worse the troubles become.

The immense deposits of mud in the bottom have been subjected to certain examinations. Its composition is found to be a mixture of vegetable and animal matter in all stages of decomposition interstratified with clayey sediment and vegetable mold brought in by tributary streams in the rainy season. The depth of this deposit averages ten feet and in places as much as 20 feet in the older reservoirs.

It is impossible to conceive how these storage-waters can be maintained in a healthy condition as long as this source of contamination is allowed to exist. It must be removed, and the question is, how? In India this is done regularly by emptying the reservoirs, and cleaning them out the first of the monsoon, and then by closing the under-slopes they catch all the subsequent drainage. Of course this is not always practicable. I hereby submit a suggestion, which has developed itself during these examinations.

Samples of mud from the bottom were easily obtained in any desired quantity by means of an ordinary hand-pump and 100 feet of stout rubber hose. The same apparatus was useful in getting the temperature and samples of water at different depths. Now the facility with which this oozy mud could be pumped up, without disturbing the purity of the water in the slightest degree, at once suggested the idea of extending this system, and adopting it as a ready means of getting rid of this objectionable deposit at a comparatively small expense, and without emptying the storage reservoir. Also, I think it proper to state that a Gwynn centrifugal pump with a runner, 5 feet diameter, having a suction pipe 17 inches diameter and discharge pipe 15 inches diameter, was used under my inspection, to remove a large quantity of black oozy dock mud. The lower end of the suction pipe was simply allowed to sink down into the oozy mass. The engines were started up, and it was soon ascertained that this kind of material could be removed at the rate of 1370 cubic yards per hour, and this rate was maintained for 9.5 hours, or a daily capacity of 13,000 cubic yards, and without changing the position of the machine. I merely mention this fact in order to show what has been done in this line.

The next question naturally arises, how will the material be disposed of? In some cases it could be discharged into the creek bed below the dam, and be carried off by storm-waters, or preferably, if there be any shallow flowage or lowland near by, heavy embankments of sand faced with gravel could be built, and material pumped behind them, thus making new high land, which would be greatly enhanced in value thereby.

Recapitulation and Conclusions.

After carefully studying all the facts and circumstances obtainable so far, I am led to draw the following conclusions:

First—That the great deposit of putrid mud in the bottom of storage reservoirs is the primary cause which gives rise to the deterioration in quality of the water. That it should not be allowed to accumulate from year to year, as is generally the case, but should be removed from time to time, and the bottom kept reasonably free from annual deposits capable of undergoing putrefaction. That it is practicable to remove this mud at an expense not much in excess of that incurred in pumping water under like circumstances. That if this is properly attended to, the conditions which give rise to excessive vegetable growth will be practically removed, and as a result vegetable life will become so small in amount as to be a matter of little consideration. That as a final result the construction and maintenance of a system of filter-beds would become entirely practicable.

Second—That the trouble with the quality of the water delivered to consumers is largely independent of the contamination in the storage reservoir, and can be traced to two separate sources, namely, turbidity during the stormy months, giving rise to deposits in the pipe system, which subsequently, when the water gets warm, takes on putrefactive fermentation and gives rise to offensive odors during the summer and autumn. That neither of these can be properly removed except by means of subsidence followed by sand filtration.

Finally, if the above fundamental sources of contamination be eradicated as far as possible, I am of the opinion that the greatest of all reasonable objections to storage-waters will be practically removed.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

NORTH STAR.—*Ledger*, June 21: This incorporation of Sutter Creek, organized over three years ago for the purpose of developing the North Star claim, between Sutter and Amador, has had a remarkable history in many ways. The sum of \$38,000 has been raised by 19 assessments of two cents each per share. These assessments have all been paid without any stock being advertised as delinquent, which experience is probably without a parallel in the mining history of the State. That the property has been economically and efficiently managed is evidenced by the amount of work done. It is a matter of deep regret that the operations of this enterprising company have not been crowned with substantial encouragement in the discovery of precious metals, for certainly no body of prospectors ever worked harder or more persistently and intelligently than they. It is now the intention to sink the shaft 200 feet deeper, making a total depth of 1000 feet. A thorough exploration by drifts and crosscuts will be made at this depth, which the managers are sanguine will lead to important developments.

MISCELLANEOUS.—Preparations are being made for the erection of a new 10-stamp mill at the McKenzie mine, near Irish Town. The transportation of rock from the Amador gold mine to the mill is still done under considerable difficulties. A cable of smaller size will be tried and will no doubt reduce the trouble somewhat.

FROM SUTTER CREEK.—The mining outlook continues to brighten up gradually. A. H. Griswold, representing San Francisco capitalists, and who has considerable means himself to invest, has gone some distance above here, in company with an engineer, for the purpose of taking water out of the old Caledonia shaft and sinking the same to a considerable depth. The Caledonia is a comparatively undeveloped claim, and has lain idle for many years. Mr. Griswold says his knowledge of the property is such as warrants the expenditure of a large sum to its development. Material for the old Rose mine is expected from the sawmills this week, when the work of cleaning out the shaft will be commenced at once. The Lincoln mill, which has been hung up for a few days to give the miners a chance to break into a new vein, is again running, and the ore is believed to be of a paying quality. C. O. Mitchell has just completed a contract for 1100 feet of five and six inch air pipe for the Hardenburgh mine at Middle Bar, which will be delivered in a few days.

Calaveras.

WEST POINT.—*Cor. Calaveras Chronicle*, June 18: The Lone Star mine has made the largest cleanup since it has been a mine, and has a pile of wealth in sight. Then the Blazing Star is paying off and taking out richer rock than ever, and the other mines are doing well.

FOR COPPER SMELTING.—*Stockton Independent*, June 18: Supt. Ferson of the Union copper mine at Copperopolis and an engineer from San Francisco will go to Milton this morning with Supt. Prugh to select a site for large coke-bins to be erected there for the mining company. Coke is used in large quantities at the copper mines, now that the company is smelting the ore, and the cost of storage and hauling the fuel is a big item. The bins will be erected so large wagons can be hauled under them and loaded from chutes. Coke is often brought to San Francisco as ballast in wheat vessels, and with a place for storage the mining company can take large lots when offered at low rates. The proposition to extend the railroad to Copperopolis has not been abandoned, as is evidenced by the fact that the coke-bins are to be built so they can be taken down easily. The frames will be bolted, and at any time the structures can be removed without destroying the lumber.

El Dorado.

NEW MILL.—*Mountain Democrat*, June 21: Last week a five-stamp mill arrived for use at the Gentle Annie mine. The five stamps now on the mine have been operating steadily since first being put in operation, and the result has been so satisfactory that Mr. Melton has secured a five-stamp mill from Grizzly Flat, which will be added to the present mill on the mine as soon as possible.

GRAVEL.—The development of a rich body of gravel in the Rogers mine at Smith's Flat is encouragement not only to the present owner of the claim, but to all parties working in the old channels in this vicinity. The extensive deposits of gravel along the old channel, which have yielded so well in the past, will yet yield big returns. New portions of the channel are being prospected for, with good results, and we recall a number of claims between Smith's Flat and Morrill's and between Webber creek on the south and Hangtown creek on the north, that during the past year or so have opened out well. Work now being done will before long open out several new bodies of this gravel, from which big returns are almost assured. About the most noteworthy and promising of these developing measures is the bedrock tunnel now being run in the Chili, Stewart and adjoining claims in the Webber creek and Chili Ravine district. The objective point of the long bore will be reached about the first of next month, after which upraises will be made and the gravel sent down through chutes. The gravel is known to be very rich, but an excess of water prevented it being worked from above to any depth. The present tunnel will drain an immense body of gravel.

GRIZZLY FLAT.—Renewed life is apparent about Grizzly Flat this summer, with prospects of a rejuvenation of that camp and the development of some of the well known claims in that vicinity. The Crystal is putting men to work and before long is expected to have quite a force on. The Mount Pleasant is steadily looking after future chances for opening out on a large scale. The Ryan mine at Henry's Diggings is getting its machinery in place and at the same time employing a dozen men. Various other claims, both quartz and gravel, are slowly going ahead and not making any bluster over it. The Linden mine, in Cedar Ravine, came to a sudden standstill at noon on Thursday last. The miners all went to work as usual in the morning, and

nothing unusual appeared to be on the tapis, but at noon all hands were laid off and the night shift notified not to come to work. Times are lively at the Delmatia mine, Kelsey, since the starting up of the electric plant and all the machinery. A full force of men is at work on the mine, and the various Huntington and other mill apparatus is in full blast and working fine. The company are now running through about 120 tons of ore every 24 hours. They have an abundance of power—in fact more than they can utilize at present.

Inyo.

ORE SHIPMENTS.—*Index*, June 18: Davis & Keyes and Silas Reynolds will make shipments of silver-lead ores this week from their mines on the western slope of the Inyo range. The former will ship two carloads and the latter one carload.

THE NEW MINES.—*Register*, June 19: The Georgia and Enterprise mines across the river, owned by Messrs. Hill and others of Bishop, are showing up in excellent shape. There is enough gold ore being taken out to keep the arastra, just built about two miles from the railroad, at work night and day. The ledge carries from 3 to 14 inches of rich gold ore. A tunnel will be run at once upon the ledge and, if results justify, a Huotington mill will be put up. The arastra is in Redding canyon.

AT CERRO GORDO.—*Inyo Independent*, June 23: It is reported that 500 or 600 tons of ore are in sight in the mine recently sold by Dunphy & O'Keefe at Cerro Gordo. The ore is said to be worth at least \$100 per ton. Teams are now hauling ore from this mine to Keeler. Thorough tests have been made of the old ore dumps at Cerro Gordo which prove that there are several thousand tons of ore there that will have a big profit by jigging. Several improved machines have been ordered from San Francisco of the same kind as that recently sent to Darwin by Hon. P. Reddy. When the machines are delivered the work of jigging will be prosecuted vigorously. This will produce a large amount of lead and silver formerly wasted. A crosscut is now being run on the 700-foot level of the Union mine. Surveys showed that this crosscut would tap the ledge 150 feet below the old workings, where so much rich ore was formerly taken out. In other parts of the mine men are taking out ore on tribute.

DEFIANCE.—Very thorough prospecting has been done of the ore dumps and the various levels and drifts of the Defiance mine at Darwin. From all this Mr. Reddy is satisfied that extensive improvements may safely be made. He has bought about 5½ miles of water-pipe and will at once put in new water-works. He bought out the Darwin water-works some months ago. As soon as the water-works are put in thorough order, work on the mine will be extended. At present only four or five men are employed there.

Nevada.

WASHINGTON DISTRICT.—*Grass Valley Union*, June 20: John Eddy, who has had much experience as a miner, has been in the Washington district, in this county, for several weeks, and is very favorably impressed with the appearance of the mines and believes that the district is going to be one of the best in the State. He speaks particularly of the Washington mine, which he has had the best opportunity of examining, which has two distinct pay chutes, the lode showing a width of from six to seven feet on the 400-foot level, the ores being free-milling and the sulphurets of high grade. The Washington is now producing well and has considerable extent of ground opened, that will furnish ore for the mill for a long time to come. Much attention has been given to development work, and the 20-stamp mill can now be kept going steadily. The pay chutes on the lode are 400 feet apart, and the pay ore shows well in free gold. The quartz lodes in the district are generally large, and the ores being of a free-milling character, give much encouragement as to future value and permanency. The Washington, Yuba and Eagle Bird are the representative mines of the district, and all good producers, and it is certain that other properties equally as productive are yet to be opened.

HARD ROCK.—*Tidings*, June 19: The Emmett W. & M. Co.'s shaft, down between 80 and 90 feet, is in very hard rock. Sinking is costing \$25 a foot at present. The California mine, near Graniteville, has started up with 20 men. The severe winter interrupted operations. At the San Jose drift mine there is a depth of 5½ feet of gravel carrying considerable gold. The width of the channel has not been ascertained. Gravel is being hoisted right along, and washing will commence next week.

GERMANIA BASIN.—*Ketchum Keystone*, June 18: Mr. S. H. Hayes gives an interesting account of the workings of the district. Mr. Hayes has worked the Tyrolean mine all winter, and has gotten out quite a large amount of ore. On account of the surface water he had to quit for awhile, and, therefore, went to work on the Emma mine. He struck a nice body of ore and got out in the neighborhood of 25 tons in 20 days work with two men. Ike Click is jigging from 10 to 15 sacks of ore per day. The ore assays about 165 ounces in silver, 65 per cent lead, and \$25.90 in gold. Nick Millick is working the Idaho, which belongs to Woods & Phillips. He is taking out from one to one and a half tons per day. Dave Fayel is working the Summit mine, and has a good lot of ore out, and the mine is looking very well. He will be ready to ship ore in July.

NORTH BANNER MINE.—*Grass Valley Union*, June 19: The North Banner mine is making a fine showing at the present time. The shaft has been sunk to a point for opening the third level below the drain tunnel, where the vein matter between walls is seven feet, of which there is a solid vein of quartz four feet in thickness. As the ledge is showing strong in the level above, this insures a good body of ore in the stopes between, and a known pay chute of over 300 feet in length, which no doubt will be found to be longer as expited upon. A station is now to be cut out at the third level, and after that the sinking of the shaft will be resumed, to be carried down to the fourth level. Heretofore the ore from the pay chute has not been sufficient to keep the 10-stamp mill constantly going, but with the opening of the No. 3 level there will be ore in abundance for this purpose. The present appearance of the mine is such as to justify the highest expectations of its future value, owing to the ledge now being strong, continuous and of high grade. The latest crushing of ore from the mine was cleaned up on Saturday last, being 160 tons, which yielded 278 ounces of melted gold, or

a result of about \$25 a ton in free gold, independent of the sulphurets, which in this mine are always of high grade.

MENLO MINE.—The water in the Meolo (Home-ward Bound) has been about pumped out, as yesterday there was only one foot and a half of water standing in the third or lower level, and this may be drained to-day, when the work of drifting can be commenced. Pumping was commenced several months ago, the mine being then filled with water, and the ground generally so completely water-soaked by the heavy rains of the winter that it has been a long contest to get the upper hand of it, and besides there was a large amount of work to be done in clearing out the caved ground in the shaft, and to do necessary retimbering. Work will now go on without interruption. The new hoisting works on the Wisconsin mine, also a part of the Menlo property, are completed, and the intention is to start up steam to-day.

THE GREAT TUNNEL.—*Herald*, June 20: The tunnel which has been started from the South Yuba river, and headed for Grass Valley, is an important enterprise, and if carried to completion will result in great benefit to the section of country through which it passes. By glancing at the map of the country it will be seen that there is a network of ledges crossing the line of the tunnel in several places. The developments that may be shown by the tunnel can hardly be guessed. There are doubtless many ledges along the line that do not crop out to the surface that will be struck. There is a big gamble in the proposition, and it is to be hoped that the parties who have started the project will complete it. We understand one of the principal backers will soon reach here from New York.

Placer.

THE MINARICA MINE SOLD.—*Herald*, June 21: The Minarica quartz mine on North Ravine has been sold by J. W. McCullough to Eastern capitalists who are going to work to develop it thoroughly. Already timbers and lumber are being hauled on the ground for the erection of a new mill and hoisting works. Col. McCullough, we understand, retains an interest and will have the superintendency of the property.

A RICH MINE.—Rock is being taken from the main shaft at the Moore mine and also from the east shaft, and in both the ore continues very rich. Mr. Thorpe, one of the owners, was in town last Saturday, and he informed us that the output of rock for the day before he thought would yield at least \$1000. From near the surface this has been a phenomenally rich lead, and its especial merit consists in the fact that the deeper they go the better it gets.

Shaeta.

POCKET MINING.—*Redding Free Press*, June 21: Pocket mining is a science, and besides a thorough knowledge of prospecting, requires lots of patience, backed up by zeal and industry. It is said of two pocket-hunters (on Rock creek, two miles above Redding) that they have taken out some \$18,000 in the past four years. Two of them, about this many years ago, sank a hole near where another pocket-hunter had vainly tried to find a pocket. Drifting in, they prospected every pan of dirt, each succeeding pan seeming to produce less colors of gold. Finally a pan of earth was hoisted up, and while the partner on top was panning it out for colors, the man in the shaft stuck his pick into the side of the shaft, and upon withdrawing it noticed gold on his pick-point. As the result of the stroke of the pick, some \$4336 was taken out in a short time, and not long since these same men found a lump of quartz and gold valued at about \$300. Such is pocket mining.

NOTES.—Much prospecting is being done at the present time, and Castle creek still commands the attention of numerous miners. Twenty thousand dollars per month with a 20-stamp mill is the yield of the Sierra Buttes (formerly the Uncle Sam) mine of Squaw creek. The Texas and Georgia mine of Old Diggings is looking better than ever. During the past year over 700 feet of tunnels have been run and over 500 feet from the surface there is an extensive ore body that will work \$100 to the ton. The Sky Blue mine above Middle creek, owned by E. P. Connor, promises to be one of the choice mining properties of the county. He has a shaft down 25 feet, on a rich pay chute of rotten quartz and rusty gold, very rich.

Sierra.

YOUNG AMERICA.—*Mountain Messenger*, June 21: It is reported that a Mrs. Plum, of San Francisco, has secured a bond on the Young America mine for a large sum. The lady was up there some time inspecting the mine. She is the first female rock sharp that has ever visited this section. Perhaps we should have said "promoter" instead of rock sharp.

Siskiyou.

QUARTZ AND GRAVEL.—*Yreka Journal*, June 19: The quartz from Charley Abbott's ledge on Greenhorn, crushed at the mill on Yreka Flats during the past two weeks, paid exceedingly well, and Charley feels bappy, with intention of taking out plenty more as soon as possible for another crushing. Thornton Thomas and George Blessing have a fine three-foot ledge in Spring Gulch, a short distance north of Yreka, which prospects very rich and averages about \$20 a ton in milling, but they are troubled with water in sinking their shaft. They wish to prospect it thoroughly to ascertain its extent, with a view of running a tunnel for drainage and working from a low point on Yreka Flats. The owners of the Joe Bentz claim on Klamath river have commenced hoisting pay gravel and expect to take out considerable dust between now and the 4th of July on the cut just opened. The McConnel claim on Klamath river, at mouth of Humbug creek, is almost opened for hoisting pay gravel from the old channel, with expectation of taking out considerable gold-dust after this week. Several other companies on Klamath river are getting down to pay gravel inside of their wing, head and foot dams, so that by the 4th of July all will be taking out the glittering dust in great abundance. Down in the Oak Bar and Humbug Bar sections of Klamath river, the miners are almost ready to commence hoisting pay gravel, and those engaged in drifting have been doing well for some time past. The quartz-mills of Boyle & Co., McCook, Hegler Bros. and Bruce Aldrich on Humbug Creek, are all in operation, and a large number of hands are busy in the ledges getting out quartz to keep them in operation steadily from now on until winter storms

again interfere with their work. At Little Humbug the miners are doing better this summer than for many years past in the placer claims, and when the water becomes short will work quartz ledges adjoining them, which prospect very rich. Louis Fahl and O. H. Lawson, who are now sinking down on their ledge at north fork of Humbug, have found very rich quartz, the ledge varying from six inches to two feet in width. The quartz pounded out in a mortar paid about \$9 to the pound, and pieces shown us contained considerable gold plainly visible to the naked eye.

NUCKET.—*Yreka Journal*, June 20: We learn that Dave Starr, a well-known mining prospector, picked up a seven-ounce nugget at Indian creek last week while prospecting. The Chinese Hydraulic Mining Co. at Spring Gulch, on Yreka Flats, is making a cleanup from successful run of two months, and expect to have water enough to run their giants another week or so. From the bedrock they have cleaned up about \$6000, with considerable more bedrock to clean and nearly a mile of sluices. The quartz-mills of Boyle & Co. and Hegler Bros. on Humbug are kept running steadily day and night, with a large number of miners at work stoping out quartz. Spencer & Co. are also getting out considerable quartz and keep McCook's mill at Forks of Humbug busy day and night.

Trinity.

NEW RIVER MINES.—*Journal*, June 20: The Uncle Sam quartz mine of New River has been purchased by John Thyngre, John Boles, E. C. Dennis and James Gulick. They took possession June 1st, and are now at work on ore that mills from \$20 to \$30 per ton. The ledge is about 20 inches, but it improves in quantity and quality as they drive in on it west. They have a five-stamp mill on the property and are doing well. Clements & Ladd are running their three-stamp mill on good ore. They recently struck a new ledge in the footwall that prospects from \$40 to \$100 per ton. Fairburn & Fullmore have leased the Tough Nut mine and are getting out some good rock. The Sherwood mine is being worked by five men; the ledge runs from 6 to 18 inches, and the company has no cause to complain of the yield of bullion. Mr. Thyngre, who gave us the above information, says he thinks the Ridgeway mine will yet turn out a bonanza, although they have had some drawbacks. He says the camp is all right but the ore is not of the highest grade.

NEVADA.

Washoe District.

SIERRA NEVADA.—*Virginia Chronicle*, June 21: On the 630 level the west crosscut from the south-west drift, 600 feet from the shaft station, is advanced 240 feet, the face continuing in porphyry and clay.

UNION CON.—On the 1465 level from the north lateral drift, opposite west crosscut No. 4, east crosscut No. 1 is in porphyry and clay.

MEXICAN.—On the 1465 level at a point 70 feet south from west crosscut No. 4, west crosscut No. 5 is in softer porphyry.

OPHIR.—On the 1300 level the winze at a point 10 feet southwest of the raise is down 32 feet, continuing in low-grade quartz.

CON. CALIFORNIA & VIRGINIA.—On the 1650 level a south drift is advanced 145 feet on the east side of the stopes. In working out from raise No. 8, continue stoping ore, 30 feet below the connection of that raise with the 1500 level north drift from the Con. Va. shaft. In the northwest drift, 60 feet from raise No. 8, are extracting ore above the sill floor. There has been extracted during the week, from all parts of the mine, 2746 tons and 1250 pounds of ore. Shipped to the Morgan mill 1099 tons and 910 pounds of ore and to the Eureka 1647 tons and 340 pounds; battery sample assays showing an average value of \$22.50 per ton; [2730 tons milled]. Bullion valued at about \$13,000 now on hand in the local assay office. Shipped bullion valued at \$55,363.94 to the Carson Mint.

SCORPION.—The southwest drift from the 660 level shaft station is advanced 650 feet and continues in clay and porphyry.

ANDES.—On the 420 level the north drift from west crosscut No. 2 is in 30 feet; formation quartz and porphyry giving low assays.

SAVAGE.—Shipped 508 tons of ore, showing an average value of \$20.32 by battery sample assays. The 1300 level north drift is showing five feet of good ore. No change in explorations at other points. Bullion on hand valued at \$13,516.70.

HALE & NORCROSS.—A 1300 level north line east crosscut is in 70 feet, showing ore. Shipped 1120 tons of ore during the week, showing an average value of \$19.50 per ton by battery sample assays. Bullion on hand valued at about \$28,000.

BEST & BELCHER.—On the 1200 level west crosscut No. 4 is extended 35 feet. Formation, soft porphyry.

GOULD & CURRY.—On the 400 level the north-west drift is extended 125 feet. Formation, soft porphyry with streaks of quartz.

WARD COMBINATION SHAFT.—The 1800 level east drift is out 435 feet; the face continues in porphyry.

POTOSI.—The winze is down 180 feet on the slope below the 930 level, the last ten feet in good milling ore.

ALPHA.—The 600 level east crosscut is in 220 feet, the face in quartz giving good assays. The 600 level west crosscut is in 205 feet, the face in quartz.

CON. NEW YORK.—The 650 level west drift is in porphyry. The 660 level north drift continues in low-grade quartz. The north drift from the top of the raise above the 800 level is out 87 feet; the face continues in low-grade quartz.

SILVER HILL.—The east drift from the winze below the 800 level is out 78 feet, the face showing bunches of quartz.

IMPERIAL.—The joint Confidence-Challenge west crosscut No. 2, same level, is in 120 feet, the face in low-grade quartz.

YELLOW JACKET.—Shipped 560 tons of ore showing average assay value of \$22 by battery sample assays.

CROWN POINT.—Shipped during the week 870 tons of ore, showing an average value of \$20.85 per ton by pulp assays. A west drift from the 400 level raise is out 67 feet.

CONFIDENCE AND CHALLENGE.—The joint Imperial 1000 level north drift from west crosscut No. 1 is out 60 feet, the face in low-grade quartz.

BELCHER.—The 1300 level east crosscut is in 112 feet. It passed through a narrow streak of quartz

assaying from \$5 to \$20 per ton and the face is now in quartz and porphyry.

CHOLLAR.—Extracted 489 tons of ore, battery sample assays showing a value of \$22.50 per ton.

EXCHEQUER.—The 500 level north line east crosscut is in 260 feet, and continues in quartz and porphyry.

SEG. BELCHER.—The raise above the 1000 level east crosscut No. 1 is up 82 feet, the top continuing in low-grade quartz.

JUSTICE.—During the week crushed 154 tons of ore showing a value of \$33.96 per ton by battery sample assays. The raise above the 622 level continues in low-grade quartz.

ALTA.—The ore output this week was 360 tons, showing an average assay value of \$22.50 per ton by pulp assays.

OVERMAN.—Shipped 488 tons of ore during the week, showing an average value of \$24.78 per ton by battery sample assays, of which \$16.65 was gold.

UTAH.—On the 725 level the incline raise is up 128 feet above the south drift, the top continuing in porphyry and quartz.

OCCIDENTAL CON.—Continue to extract ore of good quality from the stopes on the 400 and 450 levels.

Reese River District.

BULLION OUTPUT.—Reese River *Reveille*, June 19: Wells, Fargo & Co. have shipped from Austin from 1865 to 1888 inclusive \$24,929,699.92 in silver bullion. Just think of that sum. And yet this section of country is overlooked by capitalists seeking profitable investments. Of late years we have been asleep, and if we don't wake up we will snore and serve new-comers from out of the intention of remaining here. If we had nothing to offer, it would be a "horse of another color," but we have prospects that are worth many thousands of dollars. What we want is a Western company to come here and start developing some of the favorable mines that can be secured. Then we will see what mining is, and what can be done with capital scientifically directed. Over \$24,000,000 in silver bullion. That would make quite a pile to erect to the memory of Austin's mines; and who can say that there is not as much again in these silent hills? We have plenty of mines whose surface has only been stirred. What we need now is capital to stir them deeper.

Sylvania District.

BODY OF ORE.—*Chloride Belt*, June 21: There are now employed by the Sylvania Mining Co. 65 men all told. The shaft is down 86 feet. A drift was recently run from the shaft and a large body of ore uncovered which will run the smelter for several months to come. Mr. Fife, the superintendent, is now below, and on his return they will start the smelter. The mine is in Nevada and the plant in California, being only a few hundred feet apart.

Tuscarora District.

NEVADA QUEEN.—*Times-Review*, June 20: Joint crosscut between North Belle Isle and Nevada Queen has been advanced 11 feet; having no timber has retarded progress. The face is all in the vein showing some iron pyrites and water.

NAVJO.—South drift from Belle Isle line crosscut 250-foot level, extended 14 feet and suspended.

YOUNG AMERICA SOUTH.—The engine was started up yesterday and works satisfactorily. All work at present is confined to first level. As soon as it is in thorough working order, will commence on second level.

GRAND PRIZE.—400-foot level: Winze stopes show an improvement in grade of ore. Stopes on old east and west vein yielding usual quantity and quality of ore; 520 tons of ore delivered to the concentrator this week. Everything running all right.

BELLE ISLE.—North drift, 150-foot level, extended 11 feet. No. 1 north drift from Navajo line crosscut, 250-foot level, extended 17 feet. South drift from west crosscut at the north end, same level, extended 12 feet, showing some low-grade ore. South drift from the North Belle Isle line crosscut, 350-foot level, extended three feet, showing a good width of high-grade ore. An upraise has been started from the drift six feet from the face, and carried up seven feet on very fine ore.

NORTH BELLE ISLE.—The stopes above the 300-foot level have improved some since last report. The concentrator is running smoothly.

DEL MONTE.—3d level: Have started an upraise on the line, which is now up 17 feet in good working ground. Work in north drift has been discontinued until upraise is through, so as to ventilate this part of the mine.

NORTH COMMONWEALTH.—2d level: No. 1 south drift from east crosscut, in 141 feet, extended 16 feet in porphyry. No. 2 south drift from same crosscut has been run 13 feet, total, 80 feet, cutting small seams of good ore. No. 2 north drift from east crosscut advanced 12 feet, showing some ore in the face. Joint upraise is up 52 feet, six feet made during the week; top is in vein porphyry.

ALASKA.

NEW DISTRICT.—*Chronicle*, June 24: A new mining district has been organized in Western Alaska called the Cleveland Mining district and including the whole of the Kenai peninsula. John G. Copp has been elected recorder for the first year. The object of the organization is to locate and develop a number of coal mines situated near Coal Point. Willoughby & Ware's mill at Hunter bay is nearly completed, and will start up in about ten days. The owners of this mill have a fine lot of high-grade ore on the dump, and expect to realize well from their investment. At the Sheep Creek mine everything is progressing satisfactorily. The Silver Queen is turning out some fine rock.

ARIZONA.

MOHAVE NOTES.—*Miner*, June 21: Jim Cadden is taking out some good ore on the Dana. Supt. Jno. Barry has his mill running at full blast on Minnesota ore. McKinnon & Koster are having 12 tons of Alta ore worked this week. The Flores will have their hoisting works in running order by the last of the week. McDuffee & Heimrod brought in ten tons of high-grade ore from the Sunset mine on Thursday. Gross Bros. & Canyons are taking out some first-class ore on the San Antonio. Supt. Chas. Harding Park, of the Sabbath Bell mine, has commenced work with a large force of men. Messrs. Hughes and Mitchell, of the Silver Wave, '89 and Dolphin mines, have been in Kingman this week completing the sale of these properties to Judge Page-

of Los Angeles, Cal. Twigg & Kelley, of Cerbat, have just had 184 sacks of ore from their Lexington mine worked by the Kingman Sampling Co. The amount was a little less than nine tons, and assayed \$8.51 in gold and \$57.08 in silver. This was an experimental shipment, and will be repeated regularly, as there is a large quantity of ore in the Lexington, which will soon be one of the leading producers of Mohave county.

COMET.—*Tombstone Prospector*, June 22: The Comet is producing an immense quantity of shipping ore of good grade. There appears to be no end to the quantity, and the quality has improved wonderfully since the heavy shipments of six months ago. The Comet owners have a standing offer from Socorro to take 65 tons per day. At present the output is about half of that. As soon as the returns from a 20-car lot are received, the company will determine whether or not there will be a living proposition in putting out the maximum amount desired by the smelting men. If so, there will be many more men put to work. The Independence mine is making a very flattering showing that cannot but be a source of gratification to the owners. The air connection between the tunnel and incline having been made, the ventilation in the lower levels is excellent. The recent excavations made in running these connections brought to sight plenty of good smelting ore, chiefly containing argentiferous galena, cerussite, and micasite, the sulphide, carbonate and oxide of lead. The mine looks better in every particular than ever before in its history.

BRITISH COLUMBIA.

KOOTENAY LAKE MINES.—*New Westminster Truth*, June 21: Several new ledges have been located between Nelson and the Columbia, each giving a prospect. On Eagle creek the American Co. has put up a small stamp-mill and has crushed a quantity of the ore. A cleanup of the plates has given a more than satisfactory return, and if the ore carries sulphurates in considerable quantity the success of the mine is assured. Little work is being done at Hot Springs Camp at present. It is understood that the St. Paul expert has reported favorably on the Blue Bell claim and a smelter will be erected on the property. Dr. Hendryx will await the railway connection of the Great Northern (which is expected to reach Kootenay river in a couple of months), before bringing in the necessary machinery. At the Hall Brothers' mine on Toad mountain, a new tunnel is being driven in. It was reported that 800 oz. ore had been struck in this tunnel. This is not so, for the ore had not been reached. Mr. Atkins has purchased a half interest in this mine, and, with his associates, will thoroughly open it up before putting in any machinery.

COLORADO.

DUBUQUE TUNNEL.—*Aspen Times*, June 20: The permanency of the strike in the Dubuque seems now assured. There are now two places in the mine, each showing four feet of good ore. Ex-President John Scott of the Midland, who is one of the principal owners in the lease, visited the property last week and was well pleased with the showing. Shipments are now being made by jack-train, but a wagon-road has been surveyed and will be constructed in the near future which will greatly facilitate transportation.

RICHMOND HILL TUNNEL.—The site has been chosen for the Richmond Hill tunnel, which is being projected by St. Louis parties. The tunnel starts in near the level of Castle creek, back of Highland. The first place selected was farther up the gulch. The present location brings the tunnel nearly 250 feet lower down the mountain. The company has located five claims back of Highland, through which the tunnel runs. A contract will be let this week for the first 300 feet of work.

NOTES.—The Little Rule has made a connection with the shaft on the Hannibal. This gives it air, and it will now be possible to push work. The mine is looking well. The pump that has been put in at the Champion on Smuggler mountain has just been started up, and sinking will be resumed immediately.

DAKOTA.

A FINE PROSPECT.—*Deadwood Pioneer*, June 21: The Gold Colo M. Co., the property of which is located on the Parsons belt, has as fine prospects as can be found anywhere. Openings have been made in numerous places, all disclosing ore in what seems to be large bodies. Samples taken from the different openings, without any effort at selection, assay \$90.71 silver, gold, a trace, and 65 per cent lead. This last item is in itself an important one, and in connection with the silver makes the best prospect for a mine heard from this year.

THE BAILEY SMELTER.—From seven to ten teams loaded with ore daily pass through the city to the little plant. Every bit of available space is now filled to its utmost capacity.

IDAHO.

EAST FORK BELT.—*Wood River Times*, June 18: The East Fork galena belt will soon rank as the most prolific producing district in this region. After nearly to years of prospecting, its general course, dip and trend, and the location of its bodies of paying ore, seem to be reliably known. The belt is about half a mile in width, in blue lime and shale. The vein matter is porphyry, spar, quartz and ore. It carries three well-defined veins bearing ore. The most westerly of which is the most fertile and richest. There are also cross veins at intervals along the belt. The Courier is located on one of these; so is the Minerva. Both of these claims have yielded ore running from 300 to 700 ounces per ton. This belt is prospected only in spots, but its general course and recurrence is demonstrated for over 25 miles. It is believed to lead to the main Sawtooth range at Galena, to crop out at Boulder Creek, again on Trail Creek, on the East Fork of Wood River, at the head of Indian and Quigley Creeks, at Muldoon and at Era, where it is either buried under the lava or swung to the northeast in the direction of Lost River of Nicholia, and the Rocky Mountains. At Galena the Senate claims are doubtless located on just northwesterly extremity. On Boulder the Ophir group, on Trail Creek the Baltimore and Victoria group, in Parker gulch the Quaker City, Elkhorn and Parker groups, on the

divide between it and the East Fork the Independence group; farther along the Triumph, North Star, Venus, and other groups; on Indian Creek the Jackets; at the head of Quigley the Ophir group, indicate its course. All of the claims or groups of claims just mentioned have yielded greater or lesser amounts. The product is much more valuable than heretofore, the recent rise in the price of lead and silver having added from \$25 to \$150 per ton to the value of the ores of the belt; the improvements in jigging and other machinery used have made cheaper production possible, and owners are no longer in a tremendous hurry to take out the very last cent in sight without regard to the future of their properties. The belt referred to is therefore, for the first time since its discovery in 1880, about to have a chance to make a record.

NEW MINING DISTRICT.—*Avanache*, June 21: In our issue of about two weeks ago we noted the fact that a new mining district had been found on Poison creek, in this county, and that good ore had been found in one of the lodes discovered. Since then we have seen several persons who have been to that mining district. Mr. Brown is interested in a location which he describes as being between granite on one side and porphyry on the other. The lode is about 16 feet in width, showing ore that assays as high as \$364.24 in silver and \$21.10 in gold. The district is about 35 miles from Silver City, in a southeasterly direction, in the foothills, about four miles beyond Doyle's ranch on Birch creek, near the head of what is known as Poison gulch, and in sight of Point No Point. The quartz is of fine grain and of a green color, carrying some metallic silver. As yet little prospecting has been done, but from the way prospectors are flocking in, the country will soon be explored.

LOWER CALIFORNIA.

ALAMO.—*Lower Californian*, June 19: The Princess Co.'s mill at Alamo is shut down for a cleanup and repairs. The El Paso is running. Lane is running hard and has more ore than he can crush. Kerr's mill broke a pinion wheel and is laid up temporarily. The Santa Clara (Torres) mill is running on Encantada ore, and current report indicates very favorable results. Bob Mattheson, after an illness of two months, is again in camp and will probably go to work on the Encantada. No new strikes in any of the mines are reported.

SEARCHING FOR A LOST MINE.—Messrs. Louis T. Pegot, R. A. Rodriguez and Julian Rodriguez returned this week from a trip occupying two months, over into the Jacoma mountains, between here and Yuma. The express purpose of the trip was to search for a gold mine of supposed great richness, which the Indians assert was worked by Frenchmen as long ago as 1850. It was wholly on the strength of information received from Mexicans and Indians concerning the mine, which they themselves had been unable to discover, that Messrs. Pegot and Rodriguez secured an outfit and went to look for it. They reached the Jacoma mountains in the latter part of April, and after securing the services of the captain of the Indian tribe which makes its home in the vicinity, as guide, they devoted themselves diligently to the search under the general directions of their guide, but without success. Every canyon and gulch within a considerable area was closely examined, but the mine was not found, nor did the party even find a good indication in that region that prospecting had ever been carried on there. However, the men still have faith in the mine and will go and look for it again soon.

MONTANA.

THE PARROT CAVE.—*Inter-Mountain*, June 17: During the past week a cave of immense proportions occurred in the Parrot ground, and all that surface, including the small mines that are being leased by David Bricker belonging to the Parrot Co., settled at least a foot. The blacksmith shop of the Parrot Co. and the outbuildings suffered in the same manner. A great deal of curiosity is felt as to the amount of damage done to that great property below the surface. This mine, as has been frequently stated in this paper, is the most systematically worked mine in the camp, and the cave that has just occurred has demonstrated that fact. The ore that remained between the three and the two was being taken out for the past two months. The method is different in this mine from many others, as in this one the ground is stayed with waste and there is never a pillar left for stay. This part of the mine has been worked out for the past two weeks and the miners have been distributed to lower levels. The ground above has been sinking slowly, and to-day is a solid compact mass of earth between the two and the surface, it only baving extended to the caps on the 200-foot level, doing no damage of consequence even to that level. There is not another mine in the camp that would stand such a strain as this, and it is only owing to the forethought of those who have had the direction of the underground workings. It may be particularly noticeable that no waste is hoisted to the surface from this mine, but if not needed on the sixth it is hoisted to the fifth, run in on the different drifts and dumped down a raise directly over that particular place that needs filling, and where there are men who immediately take it in barrows and put it in position where it will do the greatest good. Below the surface the amount of damage done to the Parrot Co. was not appreciable. This is the second cave that has occurred in this property and in neither of them have they been attended by the loss of life or of a single pound of ore, which is considerable to say of a mine that is as extensively worked as the venerable Parrot.

THE ANACONDA PROPERTY.—*Montana Mining Review*, June 20: The mines of Montana are attracting interest from all parts of the United States, Canada and Europe, and the business of mining in the State is being quickened by it, and its effects are felt in every mining center, especially at Helena and Butte. Just now curiosity in the latter place is excited by the proposed purchase by English capitalists of the Anaconda properties in Butte and Anaconda. It is reported that others are also looking at the Anaconda plants, who are equally desirous of purchasing. It is believed that the company will sell if money sufficient is offered, and public interest in the matter is being manifested in many ways. Rumor says that \$160,000,000 has been offered. The company, however, is not showing any desire to dispose of the prop-

erty. Work is going on just the same as if a sale was not thought of, and new buildings are being erected and new schemes are being developed the same as if no proposition to purchase the mines and plants had been made. The improvements being made will greatly increase the output of the works. Their capacity now is from 3500 to 4000 tons daily. In a few weeks the St. Lawrence and Anaconda mines will be at work with an increased number of men, and the increased capacity of the smelters will not be completed any too soon for the reduction of the immense quantity of ore which will be taken from these mines. It is also said that Mr. Marcus Daly will retire from the management of this great property within a year, but this must be taken with great allowance, as the Anaconda people are not in the habit of talking about what they are going to do. It is claimed that two metallurgists of Butte have invented an improvement to the Buckner furnace which will increase the capacity of each one-half, and that the Anaconda Co. will affix the improvement to all their furnaces. If this is the case, the additional output, 2500 tons daily, will enable them to reduce their own ores and all that is being sent them. The Anaconda is a great property and those who get control of it will have to pay for it.

THE PLACER DISTRICT.—The Dimond Hill and Iron Mask properties in the Placer district are spoken of as being very valuable, the former being bonded for \$50,000. Work on the Silver Dollar in the same district will soon be begun. The proposition for the New Park and the Gold Dust Mining Cos. to unite and sink a shaft between their two properties, developing both from the same shaft, would greatly reduce the cost of development for both, and besides opening up valuable prospects, would add to the interest that is now being aroused in this old district.

STEAM HOIST.—*Boulder Age*, June 18: Steam hoisting works are being put up at the Hiawatha mine, Cataract district. Seven bars of bullion came down from the Holter mine at Elkhorn during the past week for shipment East. The Ruby mine, in Johnny's gulch, continues to improve. The shaft is down about 40 feet, and a fair-sized body of ore assaying over 200 ounces to the ton has been struck. The Wisconsin and Montana Company is sinking two shafts in the development of its property, one on the Custer lode and the other on the White Pine. P. B. Clark of Radersburg has taken a contract to load the ore on the C. & D. dump at Elkhorn on board cars. There are about 2000 tons, and the ore will go to Helena, Great Falls and other points. A spur of the railroad will be run up toward the dump. Work is progressing on the Edna and other properties of the Copper Belle M. Co., Cataract district, and the outlook improves as the work progresses. The Boulder Chief shaft is down 150 feet, and it is to be sunk another hundred feet immediately. Steam hoisting works are being erected. Three tons of ore from the Liff mine, Willow Springs district, went in to some of Helena sampling works this week. The Liff is under \$25,000 bonds to Sam Word and other Helena parties.

UTAH.

WHEELMEN STRIKE AT THE MINGO.—*Salt Lake Tribune*, June 18: Agent Officer of the smelter started last evening that some 20 of the wheelmen at the Mingo smelter struck yesterday morning for an advance of pay from \$2 to \$2.25. This the company declined to give, and as the men threatened to prevent other workmen from taking their places, the company had secured assistance from the United States Marshal's office. No trouble had so far occurred.

ASPHALTUM SHIPMENTS.—The North American Asphaltum Co. is shipping from four to five carloads of prepared asphaltum daily from their works near Thistle station, on the Rio Grande Western. This all goes to St. Louis, where the company was organized, and is used for paving streets in that city. The mine from which the rock is taken is practically inexhaustible, there being a ledge 9 to 11 feet thick underlying hundreds of acres. To get the additional asphaltum to mix with the Thistle product the Gilsonite mines in Uintah county are drawn upon, thus adding still more to the industries of Utah. By the way, the Gilsonite mines are also owned by a St. Louis company which is making regular shipments of asphaltum to St. Louis from Price station, which is the nearest railway point to the mines. The product of that mine is mostly used in manufacturing paints and varnishes.

SAN FRANCISCO DISTRICT.—*Inter-Mountain Mining Review*, June 21: At Deser-t Station in Beaver valley, ores are received by wagon from Osceola and other mining districts on the borders of Utah and Nevada. Black Rock Station is the shipping point for the Cove creek brimstone, 30 miles to the east. From Milford, a spur climbs up westward 1700 feet in 17 miles to the base of Granpian mountain, stopping at the ore-bin of the Horn Silver mine, which shipped to its smelters in Salt Lake valley an average of 90 tons of ore per day for four years, produced lead and silver which sold for \$13,000,000 and paid \$4,000,000 in dividends. For a time the mine almost ceased production, but it is now again paying dividends. Minerals of all kinds abound in the region about Milford, and a line of a hundred miles long swung round about Milford would pass over the great gold placer at Osceola, Nev., the remarkable iron ores of Iron county, the silver sandstones of Silver Reef, the coal of Kanarra and Cedar City, the antimony, salient, cinnabar, lead-silver and gold mines of the Upper Sevier, the brimstone of Cove creek, and the copper of Deseret. The Union Pacific has an extension from Milford to Pioche under construction. Through the instrumentality of Wm. S. Godbe of Salt Lake, the best mines at Pioche have been bought, put in producing condition, and only await the railroad to enter upon a second era of production.

BLUE LEDGE DISTRICT.—*Park Record*, June 21: The season's mining operations in Blue Ledge district have commenced in an unusually lively manner and there is every reason to believe that in consequence of these developments renewed and to be inaugurated soon, this year's ore yield from the mines in the district will be much larger than ever before. A few years ago mining operations in Blue Ledge district were practically at a standstill, but many of those who never lost faith in the merits of the district were finally enabled to push developments on the scale and in the manner they desired. So now the prospect is that old Blue Ledge will come to the front soon with many ore-producing mines.

MECHANICAL PROGRESS.

THE SAND BLAST seems to be coming more and more into use in operations connected with all kinds of metallic manufacture. It has long been applied with great success to the cleaning of iron and steel plates, brass, iron and steel castings, forgings, etc., for purposes where a particularly clean surface is required, free from scales, sand, etc.—such as for turning, tooling, galvanizing, plating, painting, etc. The slightly roughened surface left by the sand-blast causes the tin, zinc, plating materials, paint, etc., to adhere to it with greater force than when prepared by other methods. Hidden surfaces in cored castings can be cleaned by the rebounding of the grains of sand. The blast operates with equal facility upon flat, angular, curved and other irregular surfaces. It is proposed to apply the process to the cleaning and roughening of ship's plates previous to painting, etc. The system of blast employed is that in which steam is used to give the required velocity to the sand; but before the stream of mingled steam and sand has reached the object under operation, it is met by a counter-current of air which sweeps aside the steam and allows the sand alone to pass on, so that nothing but cool, dry sand strikes the object. The steam being thus carried away by a side outlet, connected by means of a flexible tube with an exhausting apparatus, the workman is enabled to readily watch the progress of the operation, and to direct the blast at the proper angle against all parts of the surface. The spent sand falls upon the floor, and is collected from time to time for use again. The apparatus requires steam at 50 to 60 pounds pressure per square inch.

TOOLS FROM SOFT STEEL.—It is asserted that by the new, or Dalziel, process of treating steel, any of the ordinary steels of the usual lengths and shapes for making tools, punches and dies will, when treated, become so soft as to effect a most material saving in the cost of making the desired tool; after having been softened and out to the required form, the steel is banded in precisely the same way as any of the well-known sorts, and it is claimed that the process in no way affects the chemical composition of the metal, but so alters its physical structure as to impart the qualities mentioned. In proof of this, a piece of Jespen steel, which had been softened by this method, was made into a punch for cutting a five-pointed star $\frac{1}{8}$ inch in diameter and unusually sharp at the points, the result showing that in the making of this punch a saving of about 20 per cent was effected in the cost, owing solely to the softness of the metal; after being out it was tempered in the usual way in water, then forced through German silver 3.32 inches thick, also through wrought iron 3.16 inches thick, and as a final test was forced through metal which cut only a part of the star, thus giving an unbalanced pressure tending to heat the punch. It was given a series of tests in this way, not only unusual, but which would not be resorted to except under instructions to pass from one test to another more severe; in this case the tool came out at last as perfect as when it originally left the maker's hands.

STEEL WAGONS—*Railway (English) Press*: A new departure in wagon-building is being effected at the Leeds Forge, where machinery, presses and appliances are being put down with a view to manufacturing railway wagons from one piece of metal—iron or steel—that is, the wagon itself outside the wheels, axles, springs, etc. The wagons are to be made by means of a press and dies, and in a comparatively short time, from a heated plate, the sides and bottom of a wagon can be formed. There will be no need of angle iron or steel, or of riveting. Experiments have already been carried out with mild steel, which have proved there is no difficulty in properly stamping out these wagons without making bad corners. In fact the whole wagon, when finished, seems to be one compact and solid piece of metal without flaw or crack to be seen anywhere, and it is evident no great strain or tension is caused by the manner in which the plate is treated in the process. These wagons will be comparatively cheap, so far as cost of manufacture is concerned, and they will certainly be very strong and durable, and when made as is proposed, of light, strong steel, will be comparatively light from a haulage point of view. The Leeds Forge Company may look forward to a good trade in this new departure of theirs in wagon-building.

IRON AND STEEL IN SHIPBUILDING.—How well plates of iron and steel withstand the contact with rocks, when exposed in a ship's bottom to violent collision, is shown in a forcible manner by the experience of the mammoth steamer Puritan of the Fall River line. After running ashore in the East river, she was taken into drydock. On her port side was a huge groove where the steel plates had been crushed in. The Puritan had struck the rock about 100 feet from her bow, and her momentum had forced her along over the obstruction. After about 110 feet of her plates had ground along over the rock, the steamer slipped off the reef. The damage to the hull had ended about 30 feet forward of the paddle-wheel. The effects of the contest of stone and steel presented a curious sight. The groove was almost smooth in places, the hull being merely bent in, but every few feet the metal had been torn open and jagged holes made. A number of plates

and a good many frames had to be replaced. The officers of the company regarded the accident as merely furnishing proof of the superior strength and stanchness of steel over iron in shipbuilding.

A FINELY-POLISHED, lusterless surface on tempered steel can be produced by either of the following operations: After the steel article shall have been tempered, it should be rubbed on a smooth iron surface with some pulverized oil-stone until perfectly smooth and even, then laid upon a sheet of white paper and rubbed back and forth until it shall have acquired a fine, dead polish. Any screw holes or depressions in the steel must be cleaned and polished beforehand with a piece of wood and oil-stone. This delicate, lusterless surface is quite sensitive, and should be rinsed with pure soft water only. A more durable polish can be obtained by first smoothing the steel surface with an iron polisher and some powdered oil-stone, carefully washing and rinsing. Then mix in a small vessel some fresh oil and powdered oil-stone, dip into this mixture the end of a piece of elder pith, and polish the steel surface with a gentle pressure, cutting off the end of the pith as it shall commence to become soiled. In conclusion, it should be thoroughly cleaned in soft water, when the article will be found to have a fine, lusterless polish.—*Et.*

HOW TO DRESS AND TEMPER STONE TOOLS.—A correspondent of the *Blacksmith and Wheelwright* gives from his experience the following as the best way to do such work: The workman must first see that the tools are free from cracks and flaws, and drawn down to the proper size, and allow them to cool. Tip his anvil a little from him, and with patty go around the anvil and build up a little so as to form a box that will hold water. Three sides built up will hold all the water necessary. If you have Webber's recipe, take some of the tool solution and put a little on top of your anvil, heat the tools very red, and with a light hammer work the cutting part by hammering it in the solution you have on the anvil. Heat each tool twice and work as directed, in the solution, and allow all to cool. Put an old wagon-box skin into the fire, and on this get your tools dark and drive the cutting edges in a block of cold lead, and you will have tools that will never come back broken or bent.

SKILLFUL FIREMEN.—The duty of a fireman in an engine room is something to which too little attention is given. More money can be saved by an intelligent and thoroughly competent fireman than by any other workman in a large establishment. The following paragraph is one which may well be carefully considered in this connection: The *Industrial World* says that a large manufacturing firm, the name of which, however, it does not mention, has made a new departure with a view of securing greater economy in the consumption of coal. It has concluded to deal with the firemen instead of devices to secure economy, because no matter how ingenious the latter, they will not avail if the firemen use the coal carelessly. The firm is therefore training their firemen to use fuel to the most advantage. The men who save the most fuel are to be rewarded and those who do not prove expert are to be replaced by others.

By a NEW METHOD of cementing iron the parts cemented are so effectually joined as to resist the blows even of a sledge-hammer. The cement is composed of equal parts of sulphur and white lead, with a proportion of about one-sixth of borax. When the composition is to be applied it is wet with strong sulphuric acid and a thin layer of it is placed between the two pieces of iron, which are at once pressed together. In five days it will be perfectly dry, all traces of the cement having vanished, and the work having every appearance of welding.

ROLLED STEEL CARRIAGE-WHEELS are a recent article of manufacture in Pennsylvania, which proposes to furnish a large portion of the 10,000,000 carriage and buggy wheels made in this country every year. In this connection the company makes a cold rolled steel tube, from open hearth, Bessemer or crucible steel, intended to take the place of brass, copper or tin tubes for chandelier work, railings and curtain-rods. The tubes are rolled by a process which gives them various superior qualities in increased strength, both tensile and compressive.

A LOCOMOTIVE working under a pressure of 140 to 165 pounds to the square inch, may move a railway train at a velocity of 60 miles per hour, which we are apt to think of as a wonderful speed. But it is slow compared with the rate of motion of the projectile from a modern great gun. Such projectiles flies at the rate of 1365 miles per hour, impelled by a pressure of 35,000 to 40,000 pounds per square inch.

ELECTRIC WELDING.—In some experiments lately made in England to test the merit of electric welding, a $\frac{1}{4}$ -inch iron bar was welded by means of electricity and one by hand. The former stood a strain of 91.9 per cent of the metal itself, and the latter 80.3 per cent. The electric weld, however, showed cracks when bent cold at an angle of 66°, whereas the hand-made joint stood 138° on the bend.

SCIENTIFIC PROGRESS.

Recent Electrical Discoveries.

New and interesting scientific facts in regard to electricity are constantly being evolved by students and experimenters in that fruitful field of research. Among those quite recently announced are the following:

Variations in Length of the Electric Arc.

A great variation in the length of the electric arc obtained in different gaseous atmospheres has been noticed by M. Villari. With horizontal carbons the electro-motive force that gave an arc one-sixth of an inch long in hydrogen produced one of five-sixteenths of an inch in oxygen, and one of one-third of an inch in ordinary air. With vertical carbons, especially with the negative uppermost, the length is greatly increased, and the same electro-motive force gave an arc 27.5 times as long in oxygen as in hydrogen.

Improvement in Arc Luminosity.

A method by which the luminosity of the arc light may be greatly increased is announced. The principle on which this improvement is based is that of reinforcing the luminous particles of incandescent carbon in the electric arc by a supply of hydrocarbon vapor. This is fed directly into the arc from the hollow lower carbon, fitted with a reservoir of oil and a wick. The effect of the added volume of vapor is said to be an enormous increase in the luminosity of the arc, and consequently, a most brilliant and economical light. The hydrocarbon employed is very cheap, and the hollow carbon entails a very slight extra expense; but the efficiency of the arc in watts per candle is said to be nearly doubled. The color of the arc is changed by the enriching medium to a clear yellowish white, quite different from the usual bluish glare.

Effect of the Sun's Rays upon an Insulated Conductor.

In the course of four years of experimenting, M. Albert Nodon has established the fact that when the sun's rays fall upon an insulated conductor, metal or carbon, they communicate thereto a positive electric charge, which increases with the intensity of radiations and decreases with the hygrometric state of the air. At Paris the electrification is greatest at about 1 P. M., when the air is clear and dry, but it disappears on the passage of clouds near the sun. The experiments indicate the source, or at least one source, of atmospheric electricity, as it may be assumed that the surface of the earth becomes positively electrified, while the heated air rises with a negative charge which it imparts to the clouds.

The Possible Causes of Increased Electrical Phenomena.

It is more than possible that the above hypothesis may furnish an explanation for the recent apparent increase of thunder-storm phenomena, including the frequency of such storms over forests, rivers, lakes, etc., where the cooler air causes the electrified clouds to fall toward the earth until a discharge takes place.

Electricity Direct from Coal.

In another column will be found a full notice of a discovery, just reported, of a method by which electricity may be obtained directly from the burning of coal—thus realizing at the present day the dream of the last fifty years of what has been thought a possibility to be looked for by some future generation.

LIGHT OF THE FIREFLY.—The nature and source of the light given out by this nocturnal insect has long been a puzzle to scientists. Prof. S. P. Langley of New York has lately been investigating this question, largely by the use of the spectroscopic. He finds the light is substantially from the green side of the spectrum. It is of exceedingly narrow range of refrangibility, extending only from F to C, and culminating in the green, so that it contains no appreciable heat. The amount of heat yielded, as measured with Prof. Langley's wonderfully delicate "holoscope," is less than one-half of one per cent of that given out with an equal amount of light from the candle and other common combustible illuminants. That the light produced by the firefly is a chemical product would seem to be indicated by the fact, established by Prof. Langley, that it decreased by the processes which check combustion and increased by the opposite, that nitrogen quenches it and oxygen stimulates it, while the product of the operation, whatever it may prove to be, is apparently carbon dioxide. It may prove, however, so far as can be judged at present, that these effects are simply those of variation of the vital powers and a resulting variation in intensity of the light.

A NEW AND CHEAPER LIGHT has just been announced. The invention is the result of the study of W. J. Norton of Pittsburgh, Pa., which, without being less lustrous than any light in vogue, is perfectly free from those features so destructive to both life and property that have for years characterized the use of gas, electricity and kerosene oil. It can be furnished so cheaply as to be available to all classes. While it now costs the city of New York \$150,000 per annum for its electrical street light alone, and \$30,000 more is demand-

ed, it is claimed that the same amount of light can be furnished by the new process for about \$60,000 per annum. Another recommendatory feature is the inexpensive adaptation of this intense and brilliant illuminator, as the production and the distribution of this light appear to partake of almost incredible simplicity. This invention comes from the great storehouse of chemistry, from whose rich resources will probably one day be revealed the means of extinguishing our fires with the same celerity as we illuminate our dwellings.

BREAD FROM WOOD.—A startling proposition has been made by Herr Victor Meyer. In an address recently delivered by him at Heidelberg, it is announced that we may reasonably hope that chemistry will teach us to make the fiber of wood the source of human food. If this becomes possible, an enormous stock of food will be found in the wood of our forests, or even in grass and straw. The fiber of wood consists essentially of cellulose ($C_6H_{10}O_5$)_n. Can this be made to change into starch? Starch has exactly the same percentage composition, but it differs very much in its properties, and the nature of its molecule is probably much more complex. Cellulose is of little or no dietetic value, and it is not altered, like starch, in boiling water. It really gives glucose when treated with strong sulphuric acid, as is easily shown when cotton-wool, which is practically pure cellulose, is merely immersed in it. Starch gives the same product when hoiled with weak acid. The author further quotes the researches of Hellriegel, which go to show beyond dispute that certain plants transform atmospheric nitrogen into albumen, and that this process can be improved by suitable treatment. The production, therefore, of starch from cellulose, together with the enforced increase of albumen in plants, would, he adds, in reality signify the abolition of the bread question.

ANOTHER BIG TELESCOPE.—The study of astronomy is becoming more and more a matter of general interest everywhere, while those who make it an especial study are constantly adding instruments and means to increase the possibilities of their researches into the great mysteries of the worlds around us. Just now, much is being done in the construction of telescopes of increased magnitude and improved powers of penetration. The great Lick instrument and the proposed larger one for Los Angeles, will probably soon be exceeded by one to be erected at Ealing, in England, which, reports says, has just been made single handed by Mr. Common, the astronomer. Its whole mass weighs nearly 20 tons. The enormous cylinder which forms the tube is 20 feet long and eight feet in diameter, resembling the ordinary boiler of a stationary engine. Inside this is delicately distributed some ten tons of pig iron, the whole instrument going to form the most wonderful instrument which the planet possesses. Through Mr. Common's telescope it will be easy to see no fewer than 50,000,000 stars.

PRODUCTION OF HEAT IN LIVING BODIES.—M. M. Berthelot has been making investigations in regard to the heat of combustion of the principal nitrogen compounds contained in living bodies and their results in the production of animal heat. The data and results are given for 16 nitrogenous bodies. The average heat of combustion is 9400 cal. for fatty bodies, 5700 cal. for albuminoids, and 4200 cal. for carbohydrates, taking one gram of each substance. The conclusion is drawn that a weakening of the organism, with diminution of power of consumption of the food digested, shows itself first by general deposition of the most difficultly eliminated substances—fatty matters, then by failure to get rid of nitrogenous bodies, and finally by incapacity to consume the carbohydrates.

VIBRATIONS IN BUILDINGS.—The danger and inconvenience resulting from the vibrations in buildings caused by running machinery can be to a large degree removed by increasing the speed of the engine, the idea being to set up a discordant vibration between the engine and the floor beam. The Pittsburgh Dispatch tells of a ten-horse power engine, which, on the upper story of a silverware manufactory, created such a commotion as to rattle the silverware on the shelves a hundred feet distant. A change of 25 revolutions in the speed, which change was in the direction of increasing the speed, entirely stopped the vibrations.

A NEW LAW, POSSIBLY.—In recent experiments, alloys have been formed by pressure, but William Hallcock, of the United States Geological Survey, finds that alloys may be produced from their powdered constituents without pressure at a temperature above the melting point of the alloy but below that of the constituents, the molecules simply being allowed to lie in contact. In this curious discovery he claims a new law of physics, which he proposes soon to verify further.

WOOL FIBERS.—A student at the Institute of Technology, Boston, has been experimenting for some purpose or other upon the several characteristics of the wool fiber. Twenty-two tests on domestic and Australian wools resulted in an average diameter of 2.389 centi-millimeters, an average stretch of 41.22 per cent, and a breaking strength of 23,822 pounds per square inch.

GOOD HEALTH.

Health of the State.

The monthly report of the State Board of Health for May furnishes reports from 103 cities and towns, with an estimated population of 766,625, giving the number of deaths as 1022, or the rate of 15.96 per 1000 per annum, which is a slight increase over last month. The principal causes of death are to be found among the diseases of the lungs and heart.

Consumption caused 164 deaths; pneumonia 97, seventy of which occurred in San Francisco—a marked diminution in the frequency of the disease. Whooping-cough was the cause of four deaths. Cancer was fatal to 44 persons. Heart disease caused 84 deaths. Alcoholism caused eight deaths.

Prevailing Diseases.

Whooping-cough has been almost epidemic in one or two localities. The weather for the month of May being quite favorable to those suffering from diseases of the respiratory organs, a marked decrease was noted in the prevalence of pneumonia, bronchitis and influenza, while on the other hand an increased prevalence was noted in the frequency of bowel and stomach disorders.

Smallpox.

No cases of this disease were reported in California. Dr. S. S. Herrick, the Medical Inspector appointed by the board to investigate the towns near the southern border of the State, reported to be the seat of smallpox, finds upon personal examination that the account received by the State Board of Health was very much exaggerated. He discovered no cases along the route of the Southern Pacific railway, but found that there was smallpox in Las Cruces and other contiguous villages in New Mexico, but none so close to railway travel as to seriously threaten us at present. Every precaution has been taken to prevent the spread of the disease into California, and it is to be hoped our efforts will be successful in this respect.

SILK UNDERWEAR.—R. fixed women in private life, says the New York Tribune, have never adopted the stage fashion of wearing a complete outfit of underwear made of white or colored sarah, or India "wash" silk. These materials, though washable, are unfit for use, because they cannot be sun-dried in the fresh, open air without losing color. The superiority of even a cambric handkerchief to a silk one need not be dwelt upon where any one has made use of both. The silk undergarment worn by most refined city women is an undervest of silk webbing. This garment must be made of the purest thread of silk in order to be a wholesome substitute for wool. There has been no method ever discovered which will prevent the spiral fibers of wool from drawing up in lanndering. With the most scrupulous care such garments are shrunk up, unfit for wear, long before they are worn out. Silk undervests of the purest quality are an expensive item at first, but will outlast several sets of wool underwear, and in the end pay for themselves.

IMMUNITY AGAINST POISON IVY.—There is a large number of persons who will take an interest in the statement that an immunity against this plant can be secured. At least it has been done in one instance, related by Dr. John Aulde in the New York Medical Journal. He says that Dr. George Kirkpatrick, of La Harpe, Ill., took by mistake a good swallow of the tincture (of poison ivy?), and in order to counteract the effect of the poison, large doses of olive oil were administered, and along with it about ten grains of carbonate of sodium. No immediate unpleasant effects were observed until the second day thereafter, when it was found that there was complete derangement of the cuticle, and since that time he is proof against the poison of the plant.

A CURIOUS DISEASE.—Galveston doctors have a patient on exhibition, a colored man who is afflicted with filaria. In other words, there was a little animal in his blood, usually found in the blood of dogs. The blood was placed under the microscope, where the little animals could be plainly seen. They were about 1-50 of an inch long and 1-3000 of an inch thick, and transparent. They are said to be transplanted from dogs to men through mosquito bites and even flea bites.

CARRY THE BABIES RIGHT.—A French physician, Dr. Feltz, mentions a curious apparent case of left-handedness. One child in a certain family was left-handed, and a second appeared to be so at the age of one year. It was then learned that the mother always carried her children on her left arm. She was advised to change, and, held on the other arm, the infant, having its right hand free to grasp objects, soon became right-handed.

THE ORDER IN WHICH TEETH DECAY.—Russian observations have shown that teeth decay in a quite regular order, the lower third molar being the first attacked, then the upper, then the lower fourth molar, and so on, the lower incisors and canine teeth being the last affected. Upper teeth, as a rule, are more durable than lower, right than left, those of dark persons than those of blonde, those of short persons than those of tall.

USEFUL INFORMATION.

TO DETECT DAMPNESS IN A WALL.—It is oftentimes important to detect the slightest dampness in a wall. To do so with care, the following course is recommended: Take a sheet of common gelatine, the thinnest pieces are selected; they are soaked in water for about a quarter of an hour, until they are quite soft, spread out flat on a greased sheet of glass, and stretched with the fingers until all the folds and creases that may exist are smoothed out and the whole is made thin and uniform as possible. The sheets are then dried in the air, rough or uneven edges trimmed off; then cut into strips about four inches long and two inches wide. If kept flat, in a dry place, these gelatine strips are very sensitive to moisture. If a wall is suspected of being damp, without showing it outwardly, a slip of gelatine is moved slowly over it near its surface, but without touching it. If any damp spots exist, they are indicated by the curling of the gelatine as it passes near them.

THE SIDE SADDLE DOOMED.—At last it would appear an effort is to be made to abolish the senseless side-saddle for women who wish to indulge in horseback riding. Miss Jenness, sister of Mrs. Jenness-Miller, the rising apostle of physical education for women and dress reform, is the leader of the movement. Side-saddles were introduced centuries ago by an English queen, with a short and deformed leg, who could ride in no other way. Such is the power and custom of fashion, that they have held full sway ever since. The side-saddle develops the muscles of one leg and one side of the body, to the neglect of the other side, but this is not the least of its offenses, for the peculiar position of the body while riding, encourages curvature of the spine. Abolish the side-saddle by all means.

MINERAL OR SLAG WOOL.—The use of mineral or slag wool is becoming very general as a filling for floors. It is also a protection against the spread of fire. The experiments conducted by H. H. Stanger, C. E., London, England, prove that a body of the slag or wool, say one inch thick, does not become incandescent when subjected to intense heat, only the parts in immediate contact with the flame being fused, leaving the rest intact; and even when heated through by long subjection to heat there was no radiance, a thermometer held within one-fourth of an inch not varying in the least. The Liverpool theaters have the drop-curtains lined with this material, and recently a patent has been obtained for weaving the slag wool into curtains for both theaters and other buildings.

ANOTHER SUBSTITUTE FOR SILK.—An alleged discovery of a silk-fiber substitute is reported in European circles. A London paper states as follows: Naysamra Sakasahuro, a druggist of Hikone in Omi, after many years of experiment and patient research, has succeeded in converting wild hemp (yachyo) into a substance possessing all the essential qualities of silk. Nothing is said about the process, but it is asserted that trial of the thread has been made at the first silk-weaving establishment in Kioto and other factories, with excellent results in every case. The plant in question grows wild on moors and hillsides. Its fiber is strong and glossy, in no wise inferior to silk when properly prepared. Cultivation on an extended scale would present no difficulties.

FLUID MARBLE.—The story of placing marble in a fluid condition is again set on foot, with the name of an Austrian sculptor, Friedrich Beer, as the inventor. He claims to be able to mold a particular kind of marble even as bronze is molded. The name of the marble thus treated is heryt. The new product costs little more than plaster, and is especially adapted to the ornamentation of houses and the construction of floors, baths, and small pillars. A stock company has been organized in Paris to place heryt on the market.

BRAKE WORK.—Frank J. Sprague states it as a well-known fact that the most effective brake work is when the wheels do not skid upon the track, but when they are turning under the pressure of the brake; and contrary to the ordinary braking practice, the energy of the electric train, instead of being thrown away in the form of heat, and using up the wheels and brakeshoes, can be made useful in the propulsion of other trains.

AN IMMENSE INDUSTRY is growing in the area of country bordering on and tributary to the Great Lakes. This area, now anxiously seeking the advantages of cheap transportation, exceeds 1,000,000 square miles. The coast line of the lakes is more than 2000 miles in extent. The floating property employed on the lakes is valued at about \$65,000,000.

INTERESTING EXPERIMENTS.—At the Phoenix Works at Ruhrort, Germany, experiments have been made, for some time past, in the use of carbon as a re-carbonizer in the place of ferromanganese or epiegelstein. Similar experiments have been conducted at the Brymho Basic Steel Works, Wales.

A HOUSE at South Fairfield, Mich., was set on fire by the rays of the sun, reflected from tin pane that were set out to dry.

ELECTRICITY.

Electricity Direct from Coal.

It is now asserted that the long-sought-for problem of obtaining electricity directly from the combustion of coal has actually been realized. Our technical exchanges from the East, which are in a position to best judge of the reliability of the claim, appear to receive the announcement with every evidence of their fullest belief in its reality.

The successful inventor is Mr. H. R. Cox of Maine. The conversion of heat directly into electricity without the intervention of steam boilers, engine, or dynamo, if successful on a large scale, will be of enormous value and will work a complete revolution in the industries of the world.

As yet the invention has been tried on a small scale only; but those experiments have been so successful and convincing that some of the shrewdest capitalists and mechanicians in New England have united and formed a company with a capital of \$1,000,000 to put the discovery into practical operation. A company was first organized in Maine, but the business has since been transferred to Hartford, Conn. Francis A. Pratt of the Pratt & Whitney Co. is the president of the company; R. N. Pratt of the Pratt & Cady Co. is vice-president, and Ernest Cady of the same company is the treasurer. E. Henry Hyde of Hyde & Joslyn is a stockholder, one of the directors and legal adviser of the new company. All the patents asked for by Mr. Cox have been allowed. Both foreign and domestic patents have been applied for.

The Hartford Courant says: The apparatus used for converting the heat into electricity is so simple that the company does not dignify it by the name of machine. By Mr. Cox's method, heat is changed to electricity as simply as water is changed to steam. His furnace is all that may be seen. From glowing coals comes the subtle current, without the aid of boiler, engine or dynamo, which can be made to run a dental machine, a sewing machine, and anything which requires no more power than these. No power has ever been discovered that is half so cheap as will be electricity obtained by this new process. This has been the dream—apparently impossible of realization—of all electricians, and even the Wizard of Menlo Park has almost despaired of its ever being brought about. Yet a young man, only 23 years of age, seems to have solved the puzzling problem.

Before the company was formed, Mr. Cox had a furnace at his house by which he ran many electric lights. This furnace was injured in being transferred to Hartford, and a new one of the same size has not yet been completed. Experiments and private exhibitions have been conducted here on a smaller scale, but in a short time the company intends to show to the world that with the power thus obtained anything that steam or electricity now does may be done. Several members of the company saw what could be done with the furnace of Mr. Cox before any attempt was made to remove it. The one now being built will be an improvement on the old one, and the results from it are expected to be correspondingly better. Most of the stock of the company is owned in Hartford. Some of it is held in Boston. The whole affair has been kept secret until the company should be ready to make it public. Even now the officers are unwilling to talk for publication, but gossip about the new invention has been so frequent in Hartford and elsewhere that it seems proper to print a general statement. The officers of the company say they will be ready for public exhibitions in a few weeks.

ELECTRIC LIGHT FROM GAS ENGINES.—A highly interesting fact has been brought out by Mr. O. Tirrill of New York, in some practical tests in producing electric light by using illuminating gas for driving a gas engine and a Perret dynamo. Naturally, one would suppose that the loss due to the double transformation of energy in producing the electric light from illuminating gas by this means would place the cost of the electric light far above that of gas. On the contrary, Mr. Tirrill has found to his surprise that a given amount of gas will produce far greater illuminating effects when used to drive this dynamo than when burned direct. The gasoline gas is produced by his machine for one dollar per thousand feet. The engine, it is found, consumes four feet of this gas per 16-candle power lamp per hour when driving the dynamo under full load, making the cost per lamp two-fifths of a cent per hour, so that the luxury of the electric light by this means, instead of being expensive, he finds in reality to be a great economy. Mr. Tirrill explains the phenomenon by the fact that the gasoline gas contains 80 per cent of air when delivered at the explosion chamber of the engine, and he gets the benefit of the expansion of this large volume of air by the heat of the explosion.

ELECTRIC LIGHTING AND POWER have made wonderful and monstrous strides in popularity, considering the youth of their existence, and they will continue, despite every opposition, to grow in grace and strength, till they have relegated to the rear ranks every other form of illumination, and crowded the present clumsy, hot, ungainly engines from their vantage ground, as the circe elephant clears the tank-hark plug for the rider. —C. C. Haskins.

An exchange says that on the occasion of an accident on the Buda-Pesth electric railway, in which a woman was knocked down by an approaching tram, caught by the wheels, and mangled, a number of people who witnessed the occurrence made an attempt to lynch the engine-driver and conductor.

SHOP NOTES.

Shop Suggestions.

If you take off a pulley and put on another one an inch smaller in diameter, how much should be taken out of the belt to make it run as tight as before? About an inch and a half, or once and a half the difference in the diameter of the two wheels, nearly.

An improvement has been patented in wire ropes by having two cores side by side, which gives the rope an elliptical form in cross-section. Now, why doesn't some one take the hint and place three wire ropes side by side and use them for a core in rope-driving? If they would, the next step will be to take six and make a belt of them.

A belt-maker has just been called upon to look at a belt that was supposed to be belted. The pulleys were true and in line and the shafts were parallel, yet the belt stood over on the same side and hung off as far as possible, no matter which side out it was run. An inspection soon showed that there was trouble with the shaft wheel on account of its being keyed on one side, leaving the other loose, which soon wore out large enough to let the belt draw the wheel to one side.

It was quite an improvement in loose pulleys when they first came about to have the loose wheel some two inches smaller in diameter than the other, a cone flange being left on the loose wheel for the belt to run upon to get on to the fast pulley. Since then they have been tried all ways, one huller using three wheels, the third to carry the cone sleeve reaching from the loose to the fast wheel. The instant the belt is shifted it will run of its own accord to the highest position and set the machinery in motion.

Be careful in turning up gear blanks, unless the man at the gear cutter works from the pitch line instead of the outside diameter of the wheel, for if the blank is left too small the teeth become thinner than they ought, and if too large the teeth will be made thick by the operation.

Among the change-gears that are found with a lathe, there are always two that are of the same size to be used whenever cutting threads of the same pitch as that of the leading screw. Anything finer than this will have the large gear on the screw, and all threads of a coarser pitch will have the smaller of the required pair on the leading screw.

A large hall was wanted, and a block of wood, nearly square on all sides, was brought in for the lathe man to test his skill upon. He just held it by the face plate assisted by the tail center, in hopes of turning it off into a cylindrical form endways with the grain. This he accomplished with ease, and all he then had to do was to hold it between centers in line with the grain when it was easily finished by hand, as a cylinder held in this form gives a perfect sphere while in motion with the grain in the best condition to turn smooth.

Jodglog from what may be seen in a dusty machine shop, a man must have the outfit of a diver to keep his lungs in working order. Already some one has patented a hood supplied with a hose from a blower to be thrown over the head of the glider when he has a job at the emery-wheel. The hood is supplied with a pair of opera glasses to see through, and must be a great assistance when a fine edge is wanted for a lathe tool. This, together with the sponge at the polishers', and blue glasses where an arc light must be endured, ought to set aside anything that a diver has to go through.

Flesh or Hair Side to Pulley?

Any one ever having had anything to do with the running of belts knows that the smooth side of a belt has more friction than the rough side. If more friction, then more power. If a belt on a machine, rough side to the pulley, is thrown off and turned smooth side to the pulley, it will be found that the speed is faster than by the rough side. Try it. A smooth, brightly polished faced pulley gives more friction than one that is rough; and yet how many machinists have taken a file to rough up the face of a pulley to make it "bug." One engineer says the flesh side should go next the pulley, because it is smoother and has less air pockets. The flesh side is less liable to crack on the outer circle. Air is elastic, too.

Some one has put the whole business into a poetic form as follows:

Belting has an outside hair side,
And it has an inside flesh side,
Of the question rises, Which side
Is the side that should run inside;
Which the side that should run outside?
Some aver the inside flesh side
Is the side that should run outside;
Others say it should run inside.
Some are sure the outside hair side
Is the side that should run inside;
Others say it should run outside.
Ample is the proof on each side,
Wonder which side is the right side,
My poor head, 'twixt this and that side,
Seems to be quite inside outside.



A. T. DEWEY.

W. B. EWER.

DEWEY & CO., Publishers.

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W. B. EWER.....SENIOR EDITOR

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SAN FRANCISCO:

Saturday, June 28, 1890.

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Dividend Notice—San Francisco Savings Union.
Dividend Notice—German Savings and Loan Society.

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Passing Events.

This number of the PRESS closes the volume, and it is hoped our readers will call the attention of others to the merits of the paper just at this time in order that new subscribers may commence with the next volume.

The shooting of one of the striking molders by one of the proprietors of a foundry has brought the phase of violence into the contest in this city, as has been long feared.

At last, Congress has done something definite on the silver question, by the House refusing to adopt the amended Free Coinage bill. This matter is referred to more fully in another column.

The mining outlook is quite favorable in this State, and in fact all over the coast. The miners are busy everywhere, and there is an abundance of water in all the streams for power.

Prospecting for natural gas is going on in many places in this State. Within a week a fine gas-well is reported in Santa Barbara county. In San Joaquin county there are several of these wells and doubtless others will be found.

The 9th of September is already a legal holiday in this State, and this year the Governor has declared the 8th also a legal holiday, so that there will be plenty of time to properly celebrate the anniversary of the admission of California into the Union.

Close of Volume LX.

Volume LX of the MINING AND SCIENTIFIC PRESS closes with this number. The PRESS is now the oldest journal devoted to mining in the United States. When it first began its work as the representative of this industry, the field of preclon-metal mining in this country was comparatively small and confined to few regions. Now, however, there are numerous districts and camps in all the Western States and Territories, many of which have assumed very great importance. With this advance in importance of the mining industry, the PRESS has endeavored to keep pace, and its field has widened in due proportion. During all these years, in addition to current mining news, the metallurgical processes, improvements in apparatus and machinery, etc., have been described and their value or utility commented upon. The files of the PRESS will be found to contain a complete record of matters relating to mines for the whole Pacific Coast.

The carefully prepared index on the last page of this number shows the variety and scope of the contents of the volume and the general character of the subject-matter published. While devoted to mining mainly, space is also devoted to popular science, mechanical and scientific progress, engineering and industrial pursuits, and inventions receive a liberal share of attention. More space has been devoted of late to illustrations and this feature will be still more fully cared for in the future.

Mining men and the progressive industrial classes of this coast cannot well afford to be without the MINING AND SCIENTIFIC PRESS, which is devoted to their interests. Those familiar with its merits should call the attention of others to the paper and aid us in increasing our list of subscribers.

Silver Legislation.

The action of the House in rejecting the Senate's free coinage amendment, and asking for a conference on the Silver bill, is taken to indicate that a compromise bill fairly satisfactory to bimetalists will be agreed upon. While bimetalists will gracefully accept the best bill obtainable, yet they will appeal to the public at the Congressional elections to be held this fall, in favor of the free coinage of silver. There are too many industries whose general prosperity is dependent upon silver being placed on a par with gold, to allow the metal to continue a commodity, and free coinage alone can raise it from that debased position.

Judging from the tenor of press and private advice received from Washington, it looks at this writing that the bill upon which the Conference Committee will agree will include the original features of the House bill making it compulsory to purchase 4,500,000 ounces of silver monthly, with the bullion redemption clause stricken out, and making silver certificates a legal tender and redeemable in lawful money of the United States.

According to latest authentic advice, the production of silver by the civilized nations aggregates 130,000,000 ounces a year. Of this there is used in the arts 20,000,000 ounces. India takes 30,000,000, China, Japan and the East 10,000,000, while European and other countries outside of America take for coinage 20,000,000. Total, 80,000,000 ounces. With the United States purchasing for coinage 4,500,000 ounces monthly (54,000,000 yearly), the surplus will be more than absorbed. It also stands to reason that with the latter country using so large a quantity, the price of the metal will be largely enhanced, which will force other nations to use more silver, so as to bring their yearly coinage up to the usual output. With such a condition of affairs bimetalists ought to be able to produce a change of sentiment abroad toward silver and bring about the remonetizing of silver.

A NATURAL GAS WELL.—A correspondent writes us from Carpinteria, Santa Barbara Co., that a roaring natural gas well was struck one day last week by H. L. Williams of Summerland, at a depth of only 30 feet. The well shoots up a flame of fire when lighted from 10 to 20 feet high and at night lights up the whole town. There is probably more gas escaping from the two-inch pipe which is sunk but 25 feet than is manufactured in Santa Barbara, a city of 10,000 inhabitants.

Cone Scales for Saving Gold.

Charles Trafton of Yankee Jim's, Placer county, has just patented through the MINING AND SCIENTIFIC PRESS Patent Agency a new gold-saving apparatus, the main feature of which consists in the novel concentrating or gold-catching surface.

He makes a frame or table of any suitable character, over the surface of which are secured the scales of the cones of the coniferous order. For some work—as, for instance, for coarser material—he prefers to use the scales of the larger cones, such as ara borne by the "digger" and the sugar pine. For lighter work he uses the scales of smaller cones, as of the spruce, and in some instances the scales of the cones of the fir and hemlock. These scales are closely set over the surface of the frame or table, somewhat after the manner of shingles, though not necessarily in the regular rows or lines of shingles, but in such a way as to fully cover the frame or table surface, the scales overlapping each other. They may be secured upon a perfectly plane surface, or upon a surface formed with inlines.

In either case—on account of the peculiar shape of the scales—they do not lie flat and close upon one another, as do shingles, but their free points or ends are separated from the bodies of the scales which they overlap, and especially is this separation noticeable where the scales are set to break joints, as it were, in succeeding rows, because of the lateral convexity of the scale, a space being left between the points of the overlapping scales and the meeting edges of the underlying scales. This separation is more noticeable, however, in the form where the scales are attached to inclines. The surface thus provided is a very rough one, having deep interstices and spaces.

The utility of the surface for the purpose intended lies in this fact to a great extent, as the heavier particles are caught in the interstices or spaces between the scales, which thus form riffles, while the lighter particles are washed off, it being understood that the table or frame is a washing-table, and water is to be used in connection with the ore. The water and ore flow over the surface in a direction against the raised or free ends of the scales.

The table or frame is intended to be one of a series of similar tables or frames to be placed in the sluice; but it is obvious that the same surface may be made within a properly or differently constructed frame, having sides sufficiently high to form a channel for itself. The utility of this surface is not confined, however, to its roughness, but is due also to a peculiarity of the scale which develops itself after wear.

The upper or outer surface of the scale has a skin, which, upon exposure, or by reason of friction and wear, breaks off in scaly bits, leaving underneath a fibrous kind of body, which serves excellently as a concentrating surface on account of its roughness. It is, therefore, a fact that after the scales have been in use for a time, the skins peel off and wear away, leaving this fibrous or roughened surface of the scale exposed, and the whole surface is thereby rendered more effective than it was at first. Mr. Trafton says he has found by actual experience that this form of concentrating or catching surface is very effective. It is, moreover, simple and economical in its construction, and it is practical in its operation. The surface may be readily washed and cleaned when desired. The scales may be stripped from the table and washed, and then by burning them, all material which still clings to them after the washing may be saved.

The scales will last several months of constant use, and when worn out, or when destroyed for the purpose of saving the precious material which they have caught, others may be readily substituted.

WANT TO REMOVE THEIR PLANT.—The Eureka Lake and Mining Co., which carried on hydraulic mining several years ago at Columbia Hill, have made application to Judge Keyser at Marysville to be permitted to remove 4000 feet of flume and clean up the sluice, as large quantities of gold and quicksilver were deposited, from which it is expected \$15,000 will be realized. In the application it is claimed that the removing of the flume would prevent the greater portion of 100,000 yards of debris being emptied every winter into the Yuba river.

R. McMurtry said the company had no intention to violate the law, as it had ceased mining, and asked permission to make money and protect the valley. The motion was granted with the understanding that the work is to be done under the inspection of the anti-debris officers and at the risk of the company in violating the injunction already in force against the mine.

The Molders' Strike.

On Thursday morning of this week, the molders' strike, which has lasted nearly four months, at length brought about a homicide. Edward Coogan, an apprentice molder employed in the Vulcan Iron Works, was shot and killed by James W. Kerr of the firm of Steiger & Kerr, Occidental Foundry. It seems that a man named Claussen, employed in Mr. Kerr's foundry, and one of the few who did not go on strike, told Mr. Kerr he was threatened with molestation unless he quit work at the shop. Mr. Kerr accompanied him to his home on Wednesday night and went there again Thursday morning to bring him back to the foundry. They walked together and along the way there was considerable demonstration among the apprentices and other young men on the street. As the two came near First and Minna streets, a crowd of men surrounded them, and Mr. Kerr warned them to let him and his charge alone. The strikers surrounded Claussen and threw him down and injured him more or less. They are said also to have struck Mr. Kerr, who drew his revolver, fired and killed young Coogan.

There are, as is usual in such cases, conflicting statements as to Coogan's part in the affair, and the striking molders will not acknowledge that any of their men were engaged in the matter. Mr. Kerr declines for the present to make any statement.

The unfortunate affair is greatly to be regretted. It has created great excitement in the iron-works quarter and intensified the feeling between the men and their former employers. Until this occasion there has been no bloodshed in the contest, although it has been feared, and the men who are at work had armed themselves in anticipation of molestation.

While the general public and the foundrymen concede the right of the men to strike and quit work if they choose, they do not concede any right to prevent others from working in their places, and when such men are at work, it is very poor policy for the strikers to threaten or molest them. In such a course they get no sympathy. In this particular case they appear to have molested both a workman and an employer, under circumstances when they could do no less than defend themselves as best they could. The affair will of course be investigated by the authorities at once.

Prospecting in Alaska.

Whoever finds any gold in Alaska deserves all there is in it. There is doubtless plenty of gold there, but the conditions are not very favorable. The intense cold in winter and heat and mosquitoes in summer are not conducive to comfort or good work. In that region, which is thickly wooded and watered, there is no wandering about the hills, as with us, looking for "float," but they float about themselves do the prospectors, substituting a boat for a burro, and it is generally harder work to urge a boat than a burro. There is more work and less profanity required.

Rivers wind about the region in all directions. Upon these the prospectors launch their canoes and cover their distances, landing when and where they can to look after the golden scales. There are many marshes and moss-covered bogs to cross and thick timber which must be passed for all who go on foot. As a result, canoes are in demand and universally used. To go anywhere, the men must go by water. Although the following item would sound queerly anywhere else, it is all right when quoted from the *Alaskan Free Press*: "Quite a number of boats have left Juneau this week with prospecting parties and men going to various localities to commence development work on mining claims. During the warm weather of the past week the snow has disappeared as if by magic, and it will not be long until the hills are full of prospectors."

Mining Stockholders' Rights.

The present system of working some of the mining properties located on the Comstock lode in Nevada, is unparalleled for waste and extravagance. Extravagance may not be the strongest word to use when commenting upon the acts of trustees, in whose hands the property of a million people is placed in trust, for the reason that an eminent, judicial writer once said: A public trust is one of the most sacred things of our republican institution; to abuse a public trust is the greatest of crimes.

Such opinions should suggest a very careful reading of the law governing trusteeship by those who assume control of the property of their fellow-citizens, and the penalties imposed for non-compliance with the provisions of such laws should be studiously considered. Even a

ports of the Comstock mines, dating back to 1874, '75, '76, will be found, recorded, the fact that the mills were required to return not less than 65 per cent of the mine assays.

Those bullion reports, as well as all contracts of that date, whether written or verbal, taken in conjunction with the late refusal of the superintendents to return the amount of ore shipped to mill and the assay value thereof, leaves it open for the stockholder to imagine a fraudulent concealment on the part of the management.

The Mill Company, receiving ore from the mines that have not been weighed nor assayed, or, if so disposed, appropriate 50 per cent of its valuable bullion. Who is responsible? The Act of April, 1880, imposes a fine upon the trustees for this criminal neglect of property managed by them for all stockholders. Why is not this law enforced? A great majority of the presidents and trustees of the Comstock mines are wealthy citizens.

The real estate standing in their names and their monthly salaries in one case being \$1000 per month, should be sufficient guarantee that they are able and willing to pay fines if the

tached thereto. Being an agent merely, by what possible right can he claim the privilege of selling or even of giving the proxy power of his client to a third and disinterested party? This is all wrong and without legal authority. It is another of those improper customs which are allowed to grow, like rank weeds, until they nearly strangle all other products.

This abuse of the proxy system is very near the sap root of the unlawful system of mine management which has done so much to injure mining on our Pacific Coast.

It should be stopped, and the power to stop it rests wholly with the Mining Exchanges, whose members, without authority of law or consent of their clients, give the power to elect trustees, who, we are sorry to say, too often abuse the trust thus conferred upon them.

The mining interests of this coast amount to untold millions, and the individual members of our Mining Exchanges must be of very small mental caliber to tolerate a custom unknown to law when they have been convinced by their languishing business that the custom has been and is an abuse of their rights and the rights of those whom they are pleased to term clients.

ough investigation requested therefrom. A million stockholders are certainly entitled to property protection, and a petition forwarded in proper form to Washington would doubtless find plenty of advocates among our Representatives and Senators, who would demand an investigation by the General Government. This remedy has recently been suggested to many complaining stockholders in the hope that an investigation in the interest of truth and justice will be made.

Cables for Cable Roads.

(Continued from page 427.)

This is done by laying in the strands of the cable in the manner shown in the accompanying engraving, wires of a shape which allows them to lay in between the round wires and overlap them, so as to protect them against wear from abrasion.

In the engraving, Fig. 1, a longitudinal view of one strand of a cable is shown, and in Fig. 2 a section of the same strand, showing the manner of forming such strand, a center round

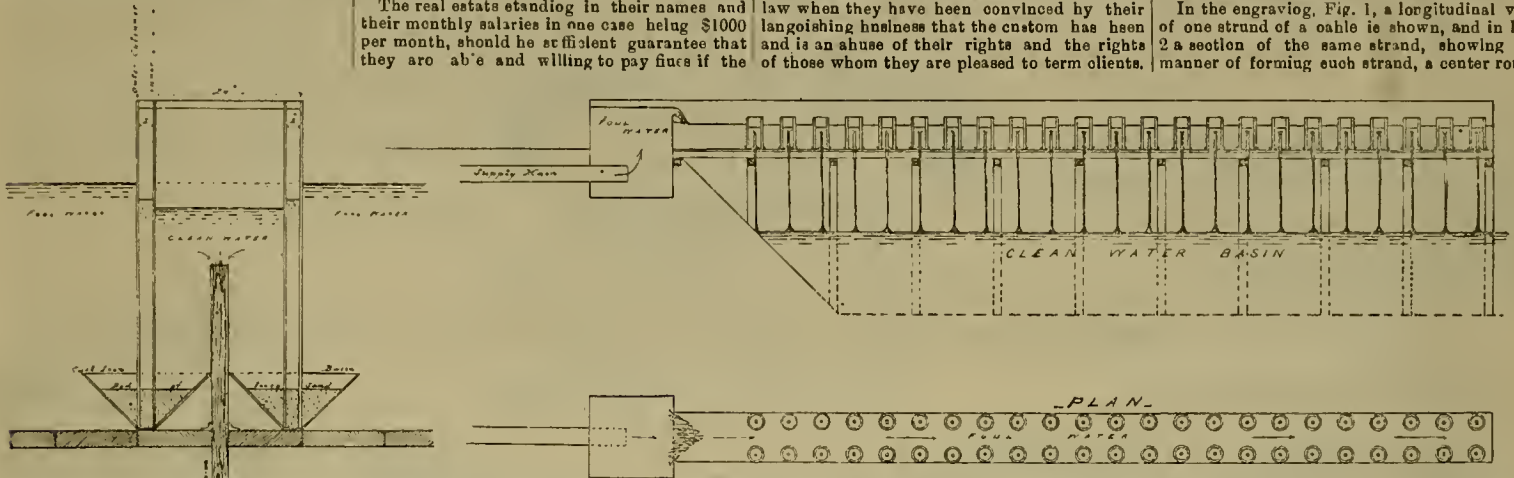


Fig. 3—SKETCH OF WOODEN "SCREEN TANKS" IN USE AT OAKLAND, 1889.—See page 429.

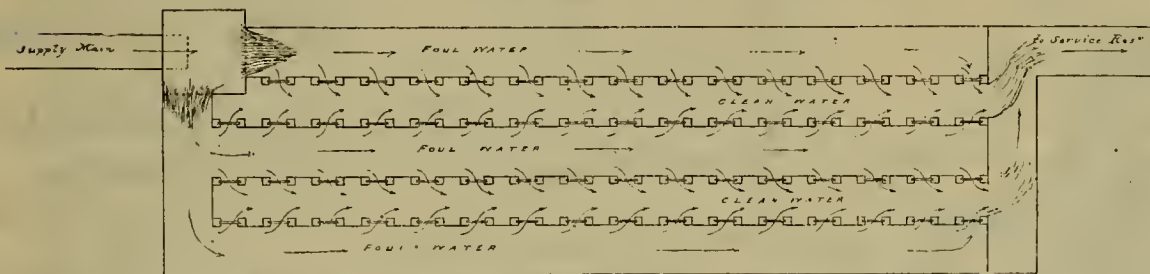


Fig. 1—SKETCH OF WOODEN "SCREEN TANKS" IN USE AT SAN FRANCISCO.

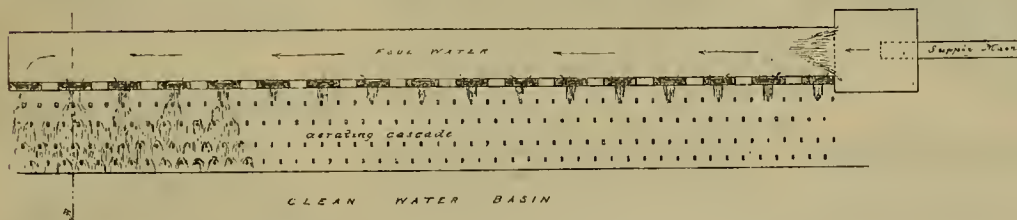


Fig. 2—PLAN OF WOODEN "SCREEN TANKS" IN USE AT OAKLAND PRIOR TO 1889.

careful study of the law might not appeal to the conscience in this age which struggles to wholly disregard the constitutional rights of the humble citizen; but it would certainly suggest an appeal to the well-filled pocket, should redress be sought in legal form by those to whom it is due. The last quarterly bullion report of the several ore-yielding mines in that section reveals a very bad condition of affairs.

It can be truthfully said that the completeness with which the system is organized commands the admiration of every one who becomes familiar with its details. It was originated by a master mind; now it has become the common practice of the common kind. The mills engaged in crushing the output of the various ore-producing mines are not owned by the mines but by certain individual incorporators, who apparently have a monopoly of the business. The mines are under control of boards of trustees, who employ superintendents to manage the property held by them in trust. These trustees, more particularly of the ore-producing mines, apparently act in collusion with the owners of mills, and they make verbal contracts to have the ore of the mines crushed by these mills. These contracts, in defiance of justice, allow the mill companies to take the ore away from the mine unweighed, to mill the same and to make any kind of a bullion return that the mill company may deem proper. In a transaction of this nature, as a matter of fact, the trustees of the stockholders must ignore the law which compels them to have the amount of ore shipped to mill and the assay value thereof reported weekly to the stockholders, as is set forth in the legislative Act of April, 1880. Among any of the old bullion re-

law invoked by the stockholders compels them. Stockholders are constantly complaining of the unjust treatment they receive at the hands of the trustees who represent their property. As the law on this subject is very plainly written, with the exception, perhaps, of the "proxy system," the fault, in too many instances, rests with that large body of stockholders who neglect to invoke the strong arm of the law which was enacted expressly for their protection and relief.

This "proxy system" is a great wrong. The San Francisco Board of Brokers and the Pacific Board of Brokers should take some joint action which should compel the respective members thereof, under penalty of heavy fine, to refuse giving the proxies of their clients' stock to be voted by any one at annual elections. The broker, according to the written contract which he makes all of his clients sign when doing commission business for the client, sets forth that the aforesaid broker is merely an agent for the principal whose name is at-

It is certainly a great oversight and a lack of wisdom to permit such an abuse to continue.

The mill company is amply protected and is fully recompensed for its labor when it has collected \$7 per ton for working ores for the mines. Even the tailings (when they are not too rich) might be allowed to go to the mill by the mining company, but when, in addition thereto, the mill company claim and actually take the slimes and slums, which assay more than \$100 per ton in too many instances, right there the stockholders should step in and establish their claims to all bullion extracted from their ores.

Herein lies the secret of much suddenly acquired wealth of millmen. It is an outrage on stockholders—a deliberate confiscation of their bullion, and the system or custom which tolerates such an injustice should be stopped. If the law invoked to stop such proceedings is found surrounded by insurmountable difficulties, then the whole matter could be made known to the General Government and a thor-

wire being covered by six round wires, and these again by six round and six V-shaped wires alternately. The six V-shaped wires project slightly above the round wires and present a broad, flattened wearing surface which protects and retards the destruction of the other wires, while the wear on the V wires is comparatively slow on account of the great surface exposed to wear.

The V shaped wire is drawn so as to fit in between the adjacent wires, and has an area in excess of what the round wire as usually used has, and being made of slightly softer material than the other wire and of milder steel, does not harden and temper under the circumstances and conditions previously referred to.

Fig. 3 and Fig. 4 are respectively longitudinal view and section of a complete cable made in the manner described, of six strands, as shown in Figs. 1 and 2.

Fig. 5 is the section of one wire of an ordinary cable, before being worn down, and Fig. 6 is the same wire when worn down by abrasion.

Fig. 7 is a section of one strand of a cable as ordinarily made, showing the line or zone of abrasion.

Figs. 8 and 9 are respectively sectional and longitudinal views of an ordinary cable, before the wires are worn, and Figs. 10 and 11 represent the same cable when worn; the inner circular line in Fig. 11 and the elliptically flattened surfaces on the wires in Fig. 10 showing the effect of abrasion.

James' Traction Engine.

A representative of the PRESS visited Rice's Engine Works, 56 Buxome street, this week, to witness a trial of an engine designed by Mr. David James. This engine is intended to be used in farming and lumbering operations, where it is not desirable to go to the expense of laying an iron or steel track.

The engine consists of a platform about 24x6 feet on which is mounted an ordinary horizontal farm boiler.

There are two cylinders—one on each side of the platform, and the piston rods are each connected directly with one of a pair of drive wheels which support one end of the engine. These wheels are about 2½ feet in diameter and 15 inches wide and have flanges on their inside edges; they are placed close together, the flanged edges an inch or so apart. The other end of the platform is supported by a pair of similar wheels. The track on which this engine runs is made of two 4 inch planks about one foot wide, placed about four inches apart. In the space between the planks the flanged edges of the wheels run and prevent the engine leaving the track.

Mr. James claims that the expense of building a road for this engine will not exceed \$1000 per mile. The trial engine is built so as to be easily handled and has a capacity for carrying quite a supply of wood and water.

W. C. RALSTON has resigned the superintendency of the Hogback mine, and on July 1st will go to Seattle to engage in the real estate business. C. F. Hoffman will take charge of the Hogback.

PARKE & LACY COMPANY

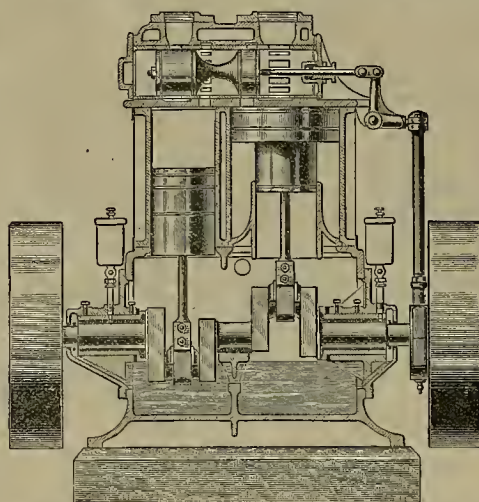
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GREATEST CAPACITY OF ANY CONCENTRATOR MADE,
One Machine Taking Pulp from 10 Stamps.



SAW MILLS, MACHINE TOOLS,
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CENTRIFUGAL PUMPS
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CAMPBELL'S STEAM FEEDS,
MILL and MINE SUPPLIES.

GENERAL AGENTS FOR WESTINGHOUSE AUTOMATIC ENGINES.

SALES DURING LAST FOUR MONTHS:

COMPOUND, 44 ENGINES,
5215 HORSE POWER.

STANDARD, 99 ENGINES,
4500 HORSE POWER.

JUNIOR, 166 ENGINES,
4260 HORSE POWER.

Grand Total, 309 Engines, Aggregating 13,975 Horse Power.

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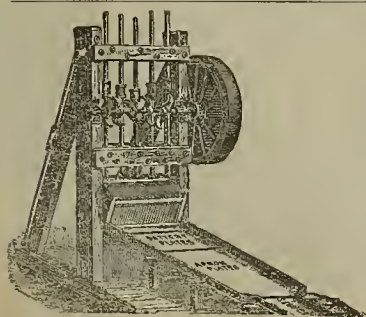
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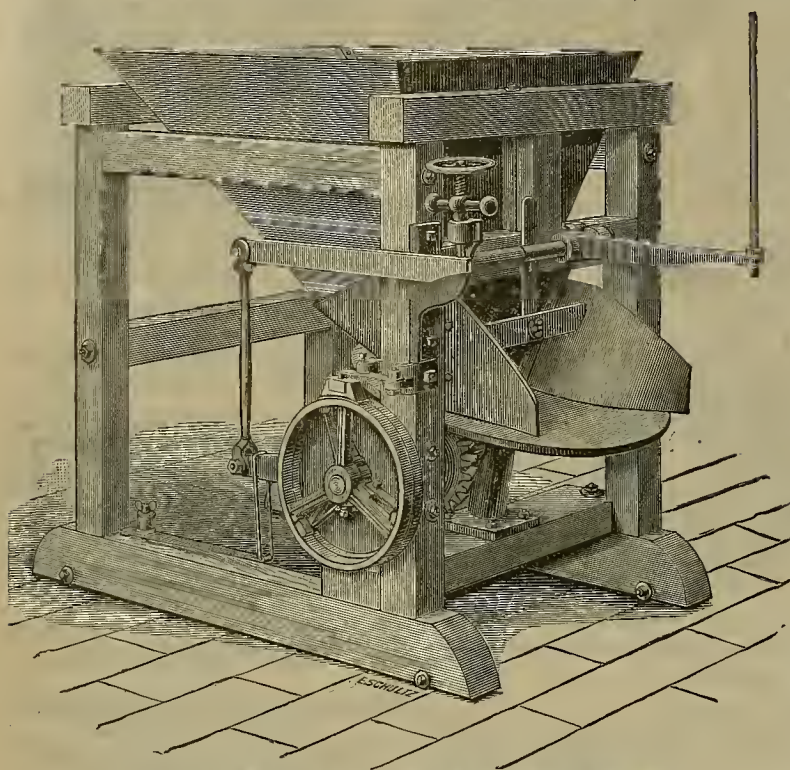
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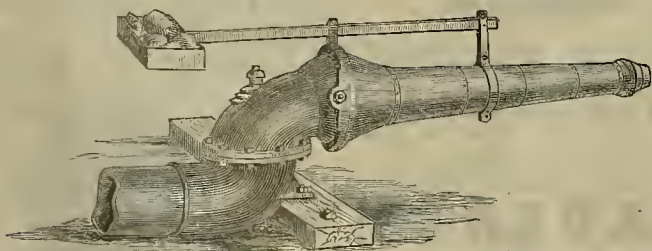
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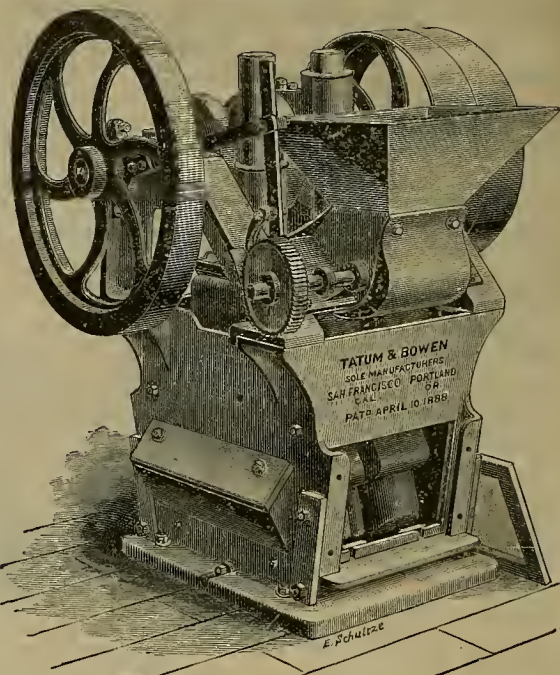


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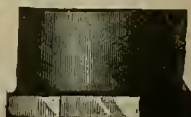
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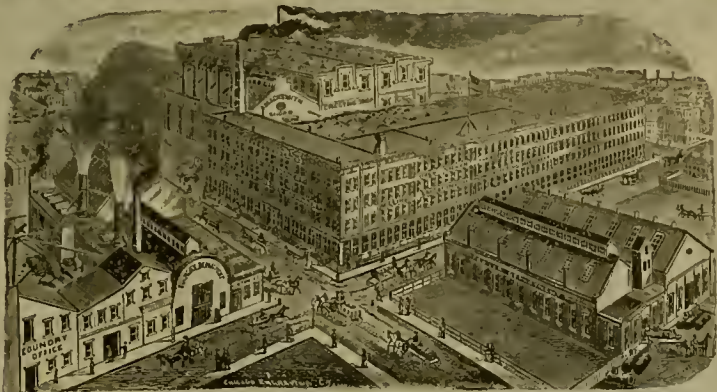
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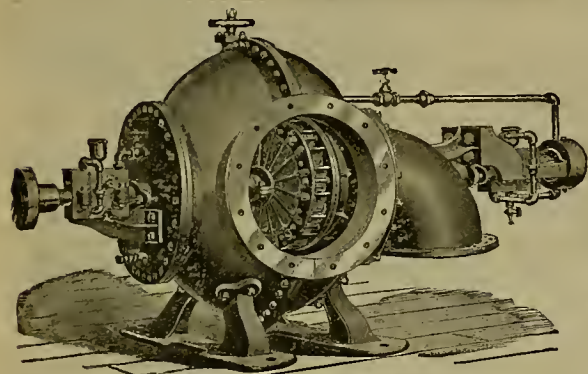
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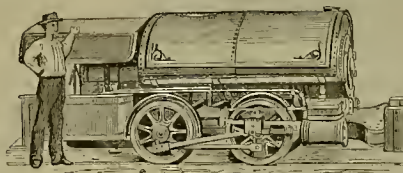
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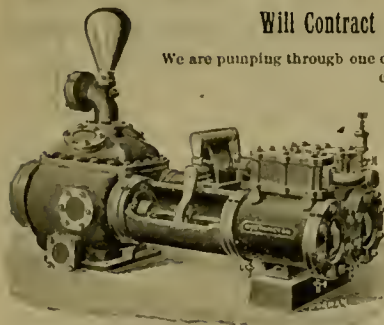
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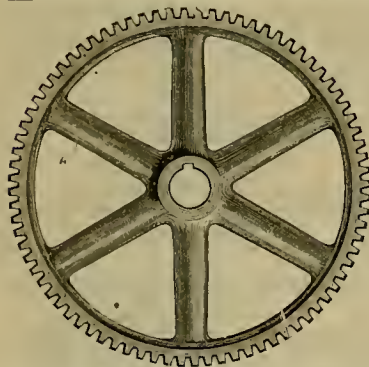
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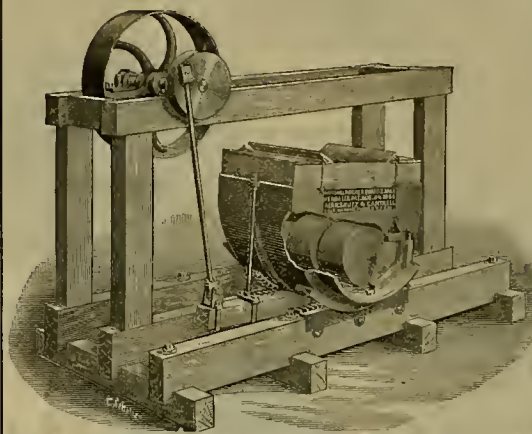
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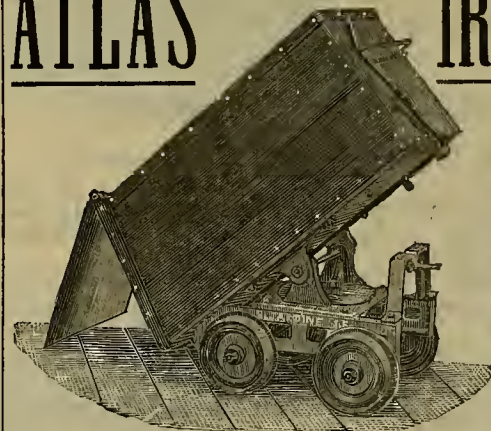
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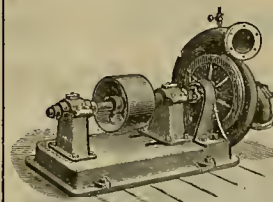
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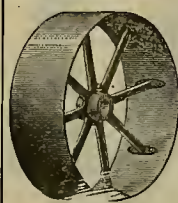
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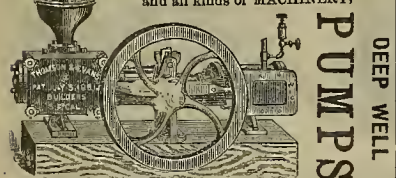
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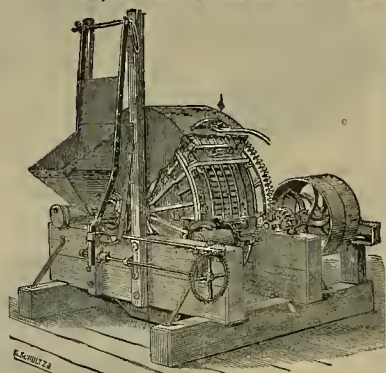
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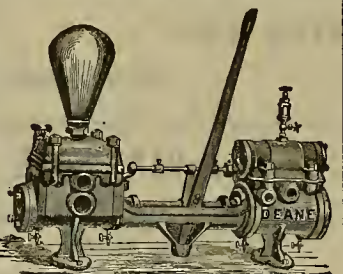
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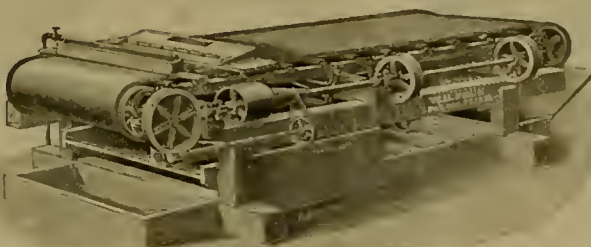
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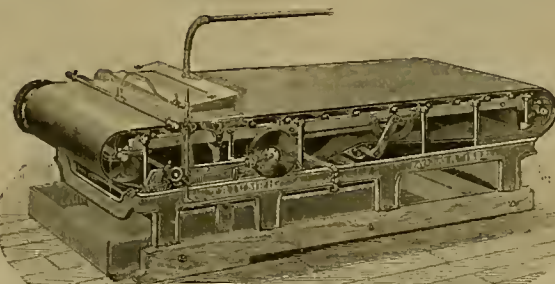
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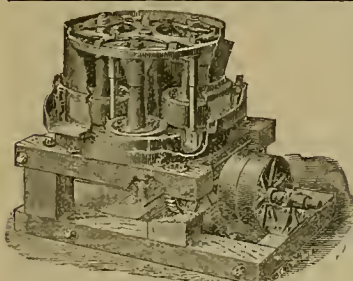
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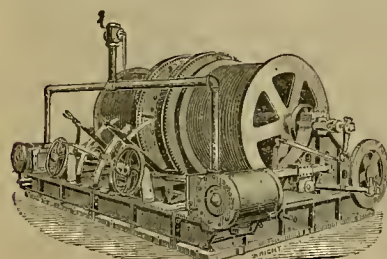
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